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COMPUTERWORLD

THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

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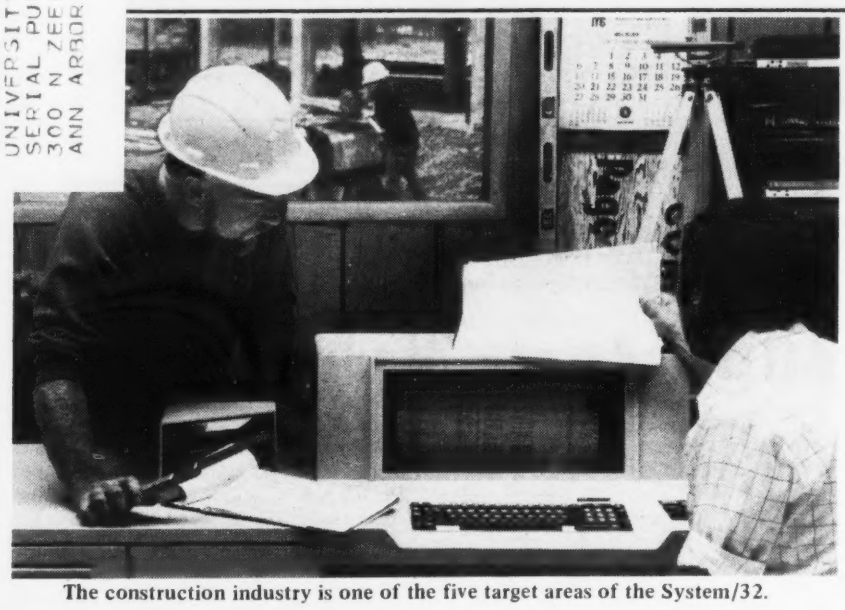

The construction industry is one of the five target areas of the System/32.

Diagnostics Built-In

All Hardware in One Box

By E. Drake Lundell Jr.
Of the CW Staff

ATLANTA – With the announcement of System/32 here last week, IBM finally put all the hardware "under the hood."

The entire unit – CPU, memory, keyboard, display, printer, disk storage and diskette station – is integrated into one desk-sized package and a change in any one component calls for a completely new package.

Even the diagnostics of the system are completely built-in and performed by the user, with no preventive maintenance calls scheduled by IBM.

These diagnostics run automatically at Initial Program Load (IPL) with any possible malfunctions displayed for the operator so that problems can be spotted before the field engineer is called.

Since most of the malfunctions can be isolated to particular boards in the system, IBM said the engineer would just bring a new board to replace the one malfunctioning.

Unalterable Processor

The system itself has a CPU featuring microprocessor with 8K of Mosfet writable control store that handles the system's software. This processor cannot be altered by the user under IBM policy, the firm said.

In addition, there are three memory sizes available – 16K, 24K and 32K bytes – with a 600 nsec cycle time.

The logic in the central processor is bipolar and the average internal machine instruction time is 1 μsec, with the average system-level instruction time placed at 60 μsec, IBM said.

The basic disk storage system is a new 169-track unit with 5M-byte capacity similar to Winchester drives. The disk is housed vertically within the Model 5320 desk-like cabinet.

A 303-track disk with a 9.1M byte capacity is also offered.

For each unit, the data transfer rate is 889 kbyte/sec. Access times range from 13 msec minimum to 180 msec maximum with an average of 70 msec on the 5M-byte unit, and 14.2 msec minimum to 167 msec maximum with an average of 72 msec on the 9.1M-byte device.

The disk units are completely enclosed like others in the Winchester series and use the same platter and heads. The arm is different, however, in that it has two heads on the surface and pivots over the data tracks instead of sliding in and out, the typical movement on other drives.

Possible Printers

The lowest models of the System/32 feature a 40 char./sec serial 7 by 7 matrix printer with an 80 char./sec matrix unit available.

There are also models equipped with 132-position line printers with speeds of 50-, 100- and 155 line/min and featuring an engraved print belt of either 48 or 68 characters.

The matrix and line printer options are mutually exclusive, IBM noted.

The diskette subsystem can read up to

(Continued on Page 2)

IBM System/32 Offers Fully Integrated Package

By Don Leavitt
Of the CW Staff

ATLANTA – Small businesses with no prior experience in data processing are expected to be the initial users of the IBM System/32 announced here last week. But communications facilities suggest the disk-based units may also be used by larger organizations as terminals or satellite processing devices.

The S/32 is "fully integrated" with no separate peripherals. The desk-sized system includes a CPU, central memory, disk storage, print capability, diskette storage, a visual display screen and a keyboard console.

The hardware rents for about half the cost of a System/3.

Although an RPG-II compiler is available, IBM's General Systems Division (GSD) stressed the availability of prepackaged Industry Application Programs (IAPs) tailored to the individual user's requirements before installation as turnkey systems.

The users for which IAPs will be available with first deliveries of the S/32 – expected to be within 60 days of announcement – include construction, wholesale food, wholesale paper and office products companies, hospitals, and membership organizations and associations.

Turnkey IAPs will be available for users in other areas, GSD indicated, but spokesmen refused to "speculate on unannounced products," either in terms of what areas would be covered or when new IAPs might become available.

No programming need be done by the IAP user, GSD said. The packages will be maintained by IBM to take care of any programming errors, and updated releases may include enhanced processing steps as well, a spokesman indicated.

Some program modifications – in the IAPs that include payroll tax calculations, for example – will be the user's responsibility but will involve no more than changes in factors used in table-driven algorithms. Users may modify the source code (RPG-II) but IBM will only be responsible for errors that occur in the unmodified code, the spokesman added.

When installed, the IAP includes everything from customized runbooks and source code to object code and all the OCL procedures and utilities (such as sorts) needed to make them operational, IBM said.

Each of the IAPs currently available functions in a minimum 16K S/32. Supervisory software requires only 2K bytes of memory, GSD noted.

The System Control Program (SCP) underlying the S/32 operations is similar in function to the SCP for the S/3 with some changes required for the differences in I/O devices, etc. Programs written for the S/32 can be recompiled and run on S/3s without any reprogramming, GSD said.

S/32 provides data management support "functionally equivalent" to that provided on the S/3 for the disk storage capacity, display screen, keyboard and print mechanism. A new buffered data management facility is provided for the display and keyboard working together, to make the programming of interactive data entry easier, the spokesman said.

All disk data access methods available on the S/3 – consecutive, direct and indexed – will be available on the S/32. Off-line multi-volume support for consecutive backup storage is provided for use with the removable diskette, he went on.

The separately priced utilities program product includes data file support, a sort

(Continued on Page 2)

Where It Fits

The System/32 announced last week by IBM's General Systems Division is in many ways a small System/3, and the designation "32" was chosen, IBM admitted, to reflect both that family tie and the new system's unique features.

The System/32 costs about half the monthly charge of a System/3. The basic 16K System/32 leases for $770/mo; the minimum usable configuration of the System/3 Model 8 – with 16K storage – leases for $1,584/mo.

IBM's latest announcement is reminiscent of the initial System/3 release: more power apparently is in the new system than is being used at this time. High internal speed, large disk storage, floppy disk I/O and hardwired recognition of the need for inquiry capability are all there, and some interactive work between operator and machine is possible.

But the current version of the System Control Program supports only a single job stream and, even though multiple terminals can be hung on the system, they can only be used one at a time.

Sanders Suit Says IBM Tactics Malign Independent Terminals

By E. Drake Lundell Jr.
Of the CW Staff

CONCORD, N.H. – IBM's marketing forces use the firm's control over compatibility and standards in order to "coerce" users into acquiring complete systems from IBM, according to an antitrust suit filed here by Sanders Associates.

The suit, which charges IBM with monopolization of the general computer market and the display terminal market, seeks damages that would amount to $255 million.

IBM sets *de facto* industry standards, Sanders charged, which it can change at will, as was the case when the firm changed from the 2260 display terminal to the 3270.

"This deliberate tactic gave IBM a substantial lead time which it utilized to capture the market while other manufacturers were delayed reengineering their products to be compatible with the newly introduced 3270 standard," the suit claims.

But IBM even goes further, the suit indicates, by intimidating users with its power.

According to Sanders, "IBM maliciously threatens customers that if 'foreign' displays or other terminals are attached to an IBM CPU," one or more of the following consequences would occur:

- "That the integrity of the entire 'system' would be impugned and guarantees could not be maintained.
- "That IBM could not service the 'system' with 'foreign' terminals attached.
- "That the 'foreign' equipment [would be] defective and would not be compatible with the IBM devices in a 'mixed system.'
- "That the continued operation of the 'mixed system' would be impaired as hardware and software changes were made by IBM.
- "That if display terminals made by Sanders and other independents are attached to an IBM CPU, the 'system' could not meet operating deadlines required by the purchaser.
- "That unless the purchaser were to order IBM terminals instead of a proposed independent manufacturer's termi-

(Continued on Page 2)

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Special Lease Plan Announced for S/32 Has Three-Year Term

ATLANTA – IBM has designed a new three-year lease arrangement specifically for the System/32 announced here last week.

The system will be available under both the new Term Availability Plan (TAP) and the older Monthly Availability Charge (MAC) 30-day lease. It can also be purchased.

Under the new TAP plan, the user gets approximately 5% off the MAC rate for a similar system and receives full rate protection for the first year of the three-year lease.

However, the TAP rates can be raised a maximum of 5% the second year of the lease and another 5% the third – the first multiyear lease plan to recognize inflation.

For the 5% break in price, the user would have to pay termination charges if he does not keep the equipment installed for the three years. The termination charges would amount to two times the basic monthly lease charge or 10% of the remaining lease obligation, whichever is lower, IBM said.

The TAP is only available for the System/32, IBM pointed out.

	System/32 Lease Rates				Purchase Price/ Monthly Maintenance	
Printer	Disk Size				Disk Size	
	5M Bytes		9.1M Bytes		5M Bytes	9.1M Bytes
	MAC	TAP	MAC	TAP		
40 char./sec	$809	$770	$898	$855	$33,100/$165	$36,100/$175
80 char./sec	$851	$810	$940	$895	$33,300/$170	$36,300/$180
50 line/min	$914	$870	$1,003	$955	$37,500/$185	$40,500/$195
100 line/min	$982	$935	$1,071	$1,020	$37,600/$195	$40,600/$205
155 line/min	$1,050	$1,000	$1,139	$1,085	$37,800/$205	$40,800/$215

The prices above are for a system with 16K of memory. Each additional 8K increment leases for $50/mo under MAC and $48/mo under TAP and carries a purchase price tag of $2,000 and a $2.50/mo maintenance charge for purchase customers.
The teleprocessing hardware options for the system include bisynchronous communications at $95/mo under MAC or $90/mo under TAP and a purchase price of $3,600 with $10/mo maintenance. The SDLC option costs $116/mo under MAC, $110 under TAP, $4,400 purchase and $15/mo for maintenance.

All Hardware 'Under the Hood'

(Continued from Page 1)
3,400 128-byte record/min or write and verify at a rate of 1,800 128-byte record/min.

The CRT display unit can display a maximum of 240 characters in six lines and features a 64-character set.

Communications is provided by attaching an optional communications adapter for support of either binary synchronous communications or synchronous data link control.

IBM System/32 Offers Fully Integrated Package

(Continued from Page 1)
and source entry routines for creation and maintenance of OCL procedures, RPG-II and sort source statements. The data file support encompasses file creation, maintenance, inquiry and listing facilities. Interactive inquiry is triggered from the keyboards. Depressing a function key suspends any batch processing, rolls the contents of memory to disk and prepares the system to handle the inquiry. After the inquiry has been processed and the user releases the system, the stored image of the suspended batch job is rolled back into memory and the work continues.

Binary synchronous communications (BSC) programming support is included in the RPG-II compiler and allows the S/32 to work directly with a variety of IBM terminals and systems, including the 360, 370, S/3, System/7, another S/32 or 3741 Models 2 or 4.

S/32 system network architecture/ synchronous data link control is a remote batch entry utility program provided as part of the SCP. It will be capable of communicating with a 370 operating under various VS subsystems.

The S/32 will be released in the U.S. and Canada at this time.

	Initial Charge	Monthly License
Applications		
Construction	$470-$2,330	$20-$100
Hospitals	$2,000	$868
Wholesale Food	$2,975	$140
Memberships	$1,485	$62
Wholesale Paper	$2,500-$2,975	$120-$455
Programming Tools		
RPG-II	---	$25
Utilities	---	$15

The Industry Application Programs (IAPs) generally provide the basic accounting support needed by small users in the target industries. In some cases, users may pick and choose facilities they need, leading to ranges of initial charges and monthly fees.

Suit Says IBM Tactics Harmful

(Continued from Page 1)
nal, it would not be possible to obtain in time components necessary to attach the 'foreign' terminal to the IBM CPU."

'Sows Confusion'

Furthermore, Sanders charged that "IBM exploits its power to unilaterally set standards to sow confusion in the marketplace in order to delay and discourage the acquisition of competitors' equipment by prematurely announcing to favored customers new products or technical enhancements often concealing, exaggerating or misrepresenting their true characteristics.

In addition, the suit contends IBM would promise customer deliveries of selected products "knowing that delivery will not be available in the time stated to the customer."

The suit also alleges that IBM maintains "dossiers" on all customers utilizing non-IBM equipment in order to refer potential display customers to only the IBM users who had had poor experiences with the non-IBM devices.

IBM not only "threatened and coerced" DP managers to keep them from using competitive equipment, but also "pressured its salesmen and other personnel to employ" illegal marketing practices "by imposing unreasonable quotas and severe penalties for the loss of orders, customers or prospects," the Sanders action claims.

Commenting on the suit, Frank T. Cary, IBM chairman, said: "We have not yet received a copy of the complaint but, based on press reports, the Sanders suit, like several other private suits against IBM, implies that IBM should protect competitors rather than improve its products for the benefit of the consumer.

"The suit appears, therefore, to be without merit and a distortion of the intent of the antitrust laws."

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PHASE 4 OF SYSTEM LIFE: OPERATIONAL SUPPORT/MAINTENANCE

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And maintenance is no easy job. It can be the most difficult programming effort in the shop, because the maintenance programmer must "think his way" into code written by someone else.

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AUTOFLOW II can analyze groups of programs together to give your maintenance programmer an index of every reference to a particular data field, or a Critical Variable Analysis which lists where every variable is tested. And AUTOFLOW II produces system charts making system structure and logic instantly visible to analysts and programmers unfamiliar with the application. In addition, all your narrative documentation can be kept up to date using AUTOFLOW II's Extended Text Compositor (ETC).

During maintenance, The LIBRARIAN protects your source code library and expedites maintenance programming. It prevents different versions of the same program from being casually or inadvertently changed and includes provisions for making trial modifications without affecting the production version of the source code.

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OCR-A Scanning Has Way to Grow, Attendees Agree

By Ronald A. Frank
Of the CW Staff

NEW YORK – Automatic scanning of OCR-A price tickets in retail stores is still in its infancy, according to statements made by both vendors and users at the National Retail Merchants Association (NRMA) annual convention here last week.

Several of the larger point-of-sale (POS) system suppliers are just beginning on-line store tests of OCR-A wand readers interfaced to terminal systems.

NCR said it is planning tests within the next months at J.C. Penney and Montgomery Ward, and Singer said it would soon install OCR-A wands on its terminals at a Sears store in Louisville, Ky.

Both suppliers said the price of these wands will depend on the results of the store tests, but an NCR spokesman said it would be realistic to assume that a retailer can add a reliable wand to a POS terminal for a price ranging from $1,000 to $1,500.

The IBM 3650 retail POS system does not yet read OCR-A and is limited to reading magnetic stripe data.

Scanning of OCR-A is especially important to retailers since the association has established this font as the industry standard. Up to now OCR scanners have been mostly stationary, instead of movable in wands, and reliability has been built up using fonts other than OCR-A, according to industry spokesmen.

Many of the earlier scanners utilized bar codes or other non-OCR scannable fonts, but in order to become acceptable to users they will have to read OCR-A at a cost of about $800, according to Richard P. Shaffer, vice-president of Gambit Management Strategies, Inc., New York.

Data Source Corp., El Segundo, Calif., one of the few suppliers of the OCR-A wand, said it will have a wand in this price range available later this year with good reliability for users.

CW at NRMA

The hand-held unit will be available as an OEM item but it will have the ability to interface to several major POS terminals already available, a company spokesman said.

Now that the NRMA merchandise identification task force has established a standard OCR-A price ticket format, the next step will be to source mark retail goods, according to Norman Weiser, vice-president of John Shillito Co. and chairman of the source mark task force.

At present only about 200 of the more than 10,000 vendors to retail stores are source marking their goods and most of these cannot be scanned by the emerging OCR-A wands, Weiser told attendees at a standards session.

Weiser quoted a test at Shillito which showed that a retailer could achieve a 51% average savings in labor or about $213,000/year per store if items were source marked by the vendor instead of the store. In many cases it will cost little to the vendor with only a change in format and font to source mark retail goods in accordance with the OCR-A standard, he said.

One of the reasons OCR-A was chosen as a standard is that it provides a potential compatibility with the supermarket Universal Product Code, according to Hans Rubner, manager of corporate systems at Montgomery Ward, who is chairman of the NRMA merchandise identification task force.

Emphasizing the importance of the OCR-A scanners, Data Source exhibited a batch ticket reader than can scan price tickets and enter the data onto a Philips-type cassette for later entry into a mainframe. The system includes the reader and a cassette unit that displays the information scanned on the last ticket read by the system.

The system will be available later this year and is expected to sell for about $1,500, a company spokesman said.

Vendors Bring POS Systems for Small Retailers

By Ronald A. Frank
Of the CW Staff

NEW YORK – Several point-of-sale (POS) systems for small retail stores were introduced last week at the 64th annual convention of the National Retail Merchants Association (NRMA).

Sweda, Pine Brook, N.J., showed its Series 800/80 system which includes an 8-character plasma display and the ability to print three transaction tickets including a sales slip, receipt and journal tape.

The 800 terminal prints at 35 char./sec and costs about $3,500 per terminal when supplied as part of a turnkey system, a spokesman said. It can include polled communications features and magnetic or optical scanning.

A complete system includes the terminal, an 8K minicomputer, a station controller for up to 16 terminals, a 2.5M-byte disk storage system and teletypewriter. The Series 800/80 sells for between $23,000 and $32,000 for the mini and associated equipment. The system is designed primarily for medium to large general merchandise companies, Sweda said.

Singer Unit For MDTS

Singer enhanced its earlier POS terminals with small and medium-sized systems. The model 805 tape cartridge data collection/transmission unit was introduced for interfacing to MDTS terminals.

The device uses a miniature tape cartridge originally developed by Cogar. The cartridge can store about 60,000 characters per cartridge or "1,200 transactions" at 60 characters per transaction.

The device can be interfaced with up to four MDTS POS terminals and reportedly will sell for about $1,750. The 805 can serve as a local data collection unit or it can be polled via private or dial-up lines.

A larger Singer system for retailers with up to 12 terminals was also displayed at the NRMA show. Called the 1500 or minicomputer collection system, it includes an 8K processor and a small 122-character CRT which can display portions of a 100-department flash total data base.

The system can interface with a Singer System 10 or an IBM 370 mainframe. First deliveries are scheduled for spring.

Disk, Printer

A larger 1503 system adds a Diablo disk drive and a Centronics printer. It can also be configured with an IBM-compatible tape drive and the system can handle up to 24 Singer POS terminals.

Singer demonstrated the new equipment but representatives said they could not quote prices.

Unitote/Regitel, Towson, Md., showed a new 40 char./sec stand-alone receive-only printer. The unit is designed to interface with the company's Minipoint POS terminal system.

Androcor, Inc., Hammond, Ind., a subsidiary of Boeing Computer Services, Inc. announced a nationwide DP service for retailers. The service includes minicomputers in New York and Chicago which poll POS terminals. The minis are linked to an IBM 370/168 in McLean, Va.

CW Photo by Ronald A. Frank

Sweda representative demonstrates sales receipt printer on the 800 POS terminal introduced at the NRMA convention.

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CW-01155

N.C. Plan Proved Impractical

Busing Systems Stopped Short by Two School Boards

By Edith Holmes
Of the CW Staff

No matter how good the hardware, the software or the model, the public continues to react warily to computerized busing systems, incidents in Raleigh, N.C., and Ardmore, Pa., have indicated.

A plan devised by two North Carolina State University professors which would revamp the program for busing elementary school children in Raleigh, for example, has received an initial cold shoulder from school district officials.

While they have met with the district's board of education several times, Dr. James H. Young and Dr. Robert S. Sowell doubt that their model will receive sufficient consideration in time to be implemented for the 1975-76 school year.

Contending there is "overbusing in the elementary schools at the present time," Young said their plan takes into account distances between schools and homes, the number of children being bused and the percentage of black students attending each school.

"Our main concerns have been to maintain certain racial ratios and to minimize the total amount of busing required," he commented.

But while school officials admit the idea has merit, they are reluctant to put the program into operation over the next year. "Such a plan would require a tremendous overhaul of our school plans, and we are not ready to do that until we feel a major change should be made in the pupil assignment plan," Raleigh's assistant superintendent of schools, Stuart Thompson, remarked.

Thompson said a school board committee is studying the proposal now, but added that any use of computers in devising a new plan would have to wait until the opening of southwest Raleigh's Athens Drive High School in 1977.

Arguing that the opening of a new high school has little to do with elementary school busing, Young and Sowell hope the board will take some action before then. Young said he suspects the real obstacle facing the board is "a lack of understanding of the computing process," rather than the opening of a new high school two years from now.

He contended that his and Sowell's plan is sufficiently expandable to include those socioeconomic factors the board fears might be left by the wayside. Based on an IBM package for solving linear problems, "our model could accommodate many more constraints if the board would just name them," he said.

Contract Canceled

Meanwhile, the school district in Ardmore canceled its contract with LKB Administrative Systems of New York City for a computerized bus scheduling and routing plan when the shuttle system devised still proved impractical by the end of October.

While the LKB plan succeeded in cutting back the number of buses used, thus saving the board of education and the taxpayers money, it also created delays and overcrowding that neither the school system nor parents and students could tolerate, according to George Ferguson, assistant superintendent of schools.

Feeling the outside company had "ample time to solve these problems since the contract had been awarded in the late spring," school officials took busing into their own hands at the beginning of November and have since reworked the plan manually.

Their revised shuttle system uses three rather than nine buses and has put an end to complaints about the busing program, Ferguson said.

Dial-a-Ride Service Blames Slow Start On Public Confusion

By a CW Staff Writer

SAN JOSE, Calif. – An unfamiliarity with computers coupled with an aversion to mass transit nearly spelled failure for the dial-a-ride bus system in Santa Clara County here [CW, Dec. 25-Jan. 1].

During the system's first week of operation, an estimated 50,000 people called for rides – but only 2,000 actually climbed on the buses.

The Arterial Personalized Transit (APT) service, which began operating six weeks ago after two years of development, enables any Santa Clara area resident to summon a bus to his door and travel anywhere in 18 neighborhood zones for 25 cents, according to Mark Horning of the Santa Clara transit authority.

The transit authority had distributed some 440,000 "rider's guides" complete with maps and detailed instructions on how to catch and ride the buses, "but it seemed no one had read them," Horning said.

He noted that initially three out of four phone callers to APT sought information only – not a ride. "There seems to be a whole generation in California that doesn't know what transfers are, let alone that a transportation system can be automated," he said.

Based on three Four-Phase IV/70 minicomputers and intelligent CRT terminals by the same vendor, the system depends on operators who enter the names and telephone numbers of riders and their pickup and delivery addresses, according to Steve Wiley, a transit authority DPer.

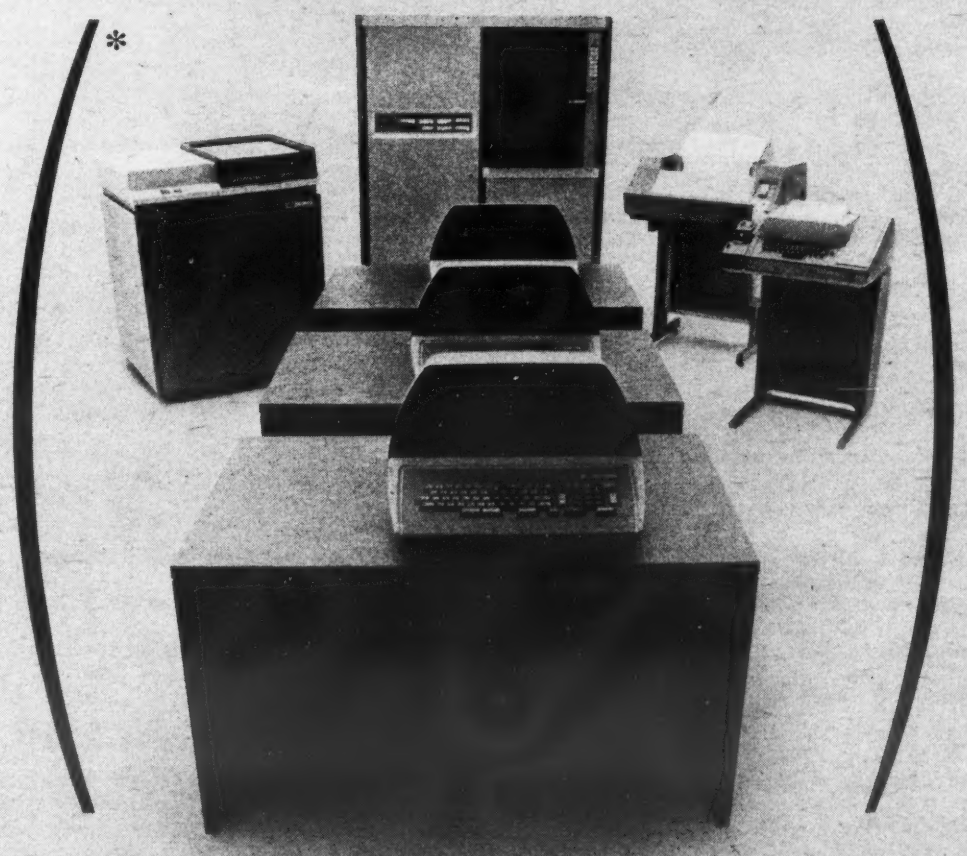
The program then determines the zones of origin and delivery and calculates the pickup and total traveling time involved. Finally, customers are informed of the time the bus is scheduled to pick them up, Wiley said.

"While the scheduling algorithm is complicated, the system's actual operation is simple," he remarked. "We've had very little trouble with either our hardware or software; the biggest problem continues to be communication with our customers."

Ridership has increased to 3,500 since the system's first week of operation and continues to go up every day, according to Horning.

Anticipating increased acceptance of the system by the county of 1.2 million people, the transit authority plans to upgrade its system from a 72K to a 96K configuration and to add three CRTs to the number of reservation screens serving each minicomputer in the system, Wiley added.

GREAT COMPUTER SECRETS*



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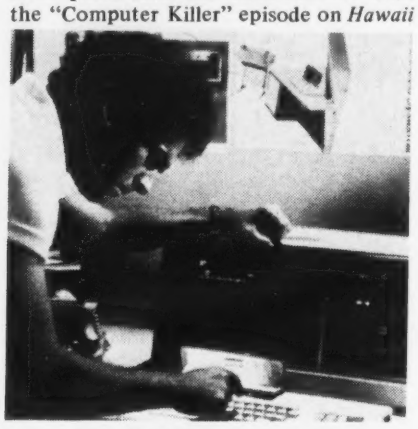
'Computernik-Turned-Killer' Spices TV Show's Plot

By Patrick Ward
Of the CW Staff

HOLLYWOOD, Calif. – DP fraud made it to prime-time television Jan. 14 with the "Computer Killer" episode on *Hawaii Five-O*.



Actor Jeff Richards does some fancy programming in his role as a computernik turned killer on a *Hawaii-Five-O* episode.

The story concerned a systems analyst hired to penetrate computer files and alter data in order to point suspicion away from a murderer. Eventually the systems analyst becomes a killer himself.

Though he said the first goal of this show, as of any television story, was to entertain, writer Tim Maschler also said he wanted to illustrate the dangers of computer abuse.

The idea "really was to show that, if there are evil people who have access to this kind of information, it can be abused."

However, he said, "We created this guy as a software expert to show that not everybody could do this."

Everything Possible

"Everything the computer killer did do is possible," said Barbara McLean, who was technical adviser for the show and is now acting product manager for Lockheed Electronics Co.

"All you need is a teletypewriter, a data file and the ability to access it," she said.

In the episode, the systems analyst, characterized as "a real egghead type," works for "World Business Machines." He approaches the father of a young man who is about to be convicted for killing his wife and tells the father that "I can get your son off" for $500,000.

The plot called for the systems analyst to secretly access systems he had designed and installed in his work for World Business Machines, but the story shows him as having the knowledge and determination to penetrate any system, McLean said.

The systems analyst works from a portable teletypewriter, but can also interface his portable teletypewriter to a Lockheed Systems III minicomputer in his home. The mini system has a high-speed printer and a display screen which outputs the stolen data.

The computer killer gains entry to a motor vehicles department computer to gain information and, to protect himself, alters an airline's computerized records to show he took a flight he had not taken.

However, *Hawaii-Five-O*'s indomitable Steve McGarrett uses his well-honed powers of deduction to figure out that World Business Machines had recently designed or installed all of the computer centers' equipment that figured in the investigation.

The process of elimination leads to the killer.

The show ended with World Business Machines declaring, "This is the kind of nightmare we were always afraid of."

Conversion Ills Lead To Tax Overcharge

ALBUQUERQUE, N.M. – A failure to credit 1,455 taxpayers with head of household and/or veterans' benefits on their yearly property tax bills was all part of a trying year for the Bernalillo County Data Processing Department here.

On Jan. 1, 1974, the county DP shop began to convert from tape-oriented batch processing on its Honeywell 2200 to on-line data entry from CRTs, systems manager Jan Clark said.

The shop purchased Total from Cincom Systems to handle its data base and ran into some difficulties while learning to work with the new system, she said.

There were some read/write errors that Total "was not telling us about . . . so we just went on," she said. The staff still can't pinpoint whether the errors were due to a voltage problem with a disk drive, a deteriorated disk pack or read/write errors, Clark said.

"All of a sudden we found we had some faulty data, but didn't know what point in time this happened to us," she said. "We had to go back to Jan. 1 and recover our file."

In the process of recovering the file, the shop lost data entered on June 20 and 21 when it had been working on the head of household and veterans' exemptions, Clark explained.

Taxpayers took a notable interest in the bills lacking exemptions, and the assessors sought a court order for the DP department to send out corrected bills.

For DP's Sake

Art has been popping up all over and now is making its way onto the traditionally sterile walls of DP centers. A full color art poster entitled "Lucid Dimensions," the second in a series to be commissioned by Memorex Corp., is now available free to DPers. Clifford Spohn, a California artist and creator of the poster, describes it as a visual attempt to portray man's pursuit of understanding. The poster was displayed at the Society of Illustrators of New York annual show.

The new poster, which has no sales message, can be obtained by writing to Memorex, MS 0064, 1200 Memorex Drive, Santa Clara, Calif. 95052.

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The GCS 2100 is a complete data entry system: it lets you collect and edit data at the source (data is actually edited while it is being keyed).

Store the data on disc. Then transfer the clean data to an output media like magnetic tape.

(Conversely, data already on tape or cards can be re-submitted to the GCS 2100 for editing, reformatting, etc.)

By editing input data before it goes to disc storage, the GCS 2100 lets you quickly spot errors that could have become costly.

The GCS 2100 can interface up to thirty-two Touch-Tone® telephones. Card readers. Medium and high speed line printers. Four-tape drives. Four fixed or moving head discs.

All on a single system.

The GCS 2100 provides extensive I/O functions that allow you to transfer data to and from disc storage and other I/O devices, and provides an audit trail (comprehensive statistical reports aid in monitoring the system and the operator's performance), all with minimum impact on a supervisor's time.

The GCS 2100 can accommodate up to 64 local or remote terminals: local terminals can be located up to 2500 ft. from the system's CPU. You get faster, more accurate data entry for functions like payroll, shipping, receiving and manufacturing, because the person most familiar with the data does the keying. (Note: we can supply a typewriter keyboard and a special CRT format so this person doesn't have to be a keypunch operator.)

In addition to data entry from local terminals, the GCS 2100 offers data entry from remote terminals (it can handle up to five remote terminals over one dedicated telephone line); Touch-Tone® data entry; remote batch communications; and word processing.

A Programmable Extension Package (PEP) extends the power and the flexibility of the 2100 system: up to 255 PEP tables provide capabilities like automatic data insertions; range and value checks; table look-ups; logical tests; character expansion (the operator keys S.D., South Dakota is generated on output); and automatic format switching.

And because these tables are not job assigned, they can be used on several different jobs. (Note: no programming experience is needed to work with PEP.)

A library of over 100 special edits is also available. It handles things like field relocation; special balancing routines; manipulation of constants; and output editing requirements. (If there isn't an edit for your needs, we can design one.)

The GCS 2100 also provides up to 99 format levels per job; up to 255 balance accumulators; variable length record and blocking factors; and up to 255 jobs stored in the system.

GCS DataTel: provides remote batch communications capabilities between the GCS 2100 systems and other 2780-compatible terminals and mainframes. And since the batch transmission of data is directly from disc to another mainframe, the usual step of transferring data to tape can be eliminated.

GCS DataTone: is a low-cost, efficient and convenient method for collecting numeric data from remote sites. It is designed for updating inventory, shipping documents, orders, etc.

DataTone answers automatically and handles up to thirty-two incoming lines at once.

With DataTone, the GCS 2100 system can accept incoming telephone data without interrupting data entry from the terminals.

GCS DataText: is a multi-purpose shared-processor approach to word processing. Designed for high-volume typing requirements, it is a fast, efficient, low-cost method for producing customized letters, envelopes, forms, labels and reports.

And since DataText uses a disc library, manual handling of storage media like cards, cartridges, etc. is eliminated.

If you'd like to get in on more Great Computer Secrets, contact Agent 2100 at General Computer Systems, Inc., 16600 Dooley Road, Addison, Texas 75001. (800) 527-2568 toll free. In Texas (214) 233-5800.

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Apparently, they've seen some of the results.

Eclipse has been running Fortran benchmarks faster than an IBM 370/155.

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It's even beaten out a Xerox Sigma 9.

And those benchmarks were not ones we designed to make Eclipse look good. We only ran programs that prospects asked us to run.

Not only that, the Eclipse they were run on was using core memory. If we had used semiconductor memory with cache, you can imagine what would have happened.

Eclipse may have caught the competition off guard, but that's just what we expected it to do.

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But making a computer fast is one thing. Getting all that speed out of it is another.

So we also came up with a sophisticated new set of Eclipse software: A Fortran 5 package, and a new Mapped Real Time Disc Operating System with features like virtual overlays and window mapping. (Which you may not have heard about because we just invented them.)

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Editorials

In Whose Interest?

After several agonizing delays the Federal Communications Commission has finally "ruled" that it cannot agree on the merits of AT&T's Dataphone Digital Service (DDS).

While promising an all-digital service specifically designed for data users, DDS also shaved existing private-line phone rates by about 40%. This presented a competitive problem to the FCC. It had to decide whether the customer benefits of DDS outweighed the possibility that the new specialized carriers might be forced out of business by the pricing advantage proposed by AT&T.

Having created the climate of competition that fostered MCI, Datran and the other newer carriers, the commission obviously sensed some responsibility to assure that they would not be throttled by the competitive might of the Bell System. At the same time the modem manufacturers warned that the emergence of all-digital service would eliminate the need for data sets.

So not wishing to favor either side in this controversy, the commission decided to involve the innocent bystander – the data user. In its decision, the FCC ruled that AT&T could begin DDS service in five initial cities at the lower rates. It also ordered AT&T to offer the service for a maximum of one year at higher existing rates in an additional 19 cities.

In explaining this two-tier pricing, the commission said, in part, "We do wish to learn more of the market demand for the DDS class of service . . ." What it should have added is that the user will be required to pay higher rates for a limited time to gather the necessary results of this government-sponsored marketing study.

AT&T has said that service cannot begin to the first of the 19 additional cities for about six months. That would leave only six months additional before the FCC-imposed one-year limit is concluded.

For users who plan their communications networks several years ahead, six months is a relatively short time. We hope that at the end of this irrational period the commissioners can bring themselves to make a real decision on DDS.

In the interim, a user boycott of DDS service in the 19 cities that have the higher price tag would transmit a loud and clear message to the commission.

It would say that the user has no intention of being made to pay for the competitive controversies on which the FCC must rule. The commission is chartered to act in the public interest.

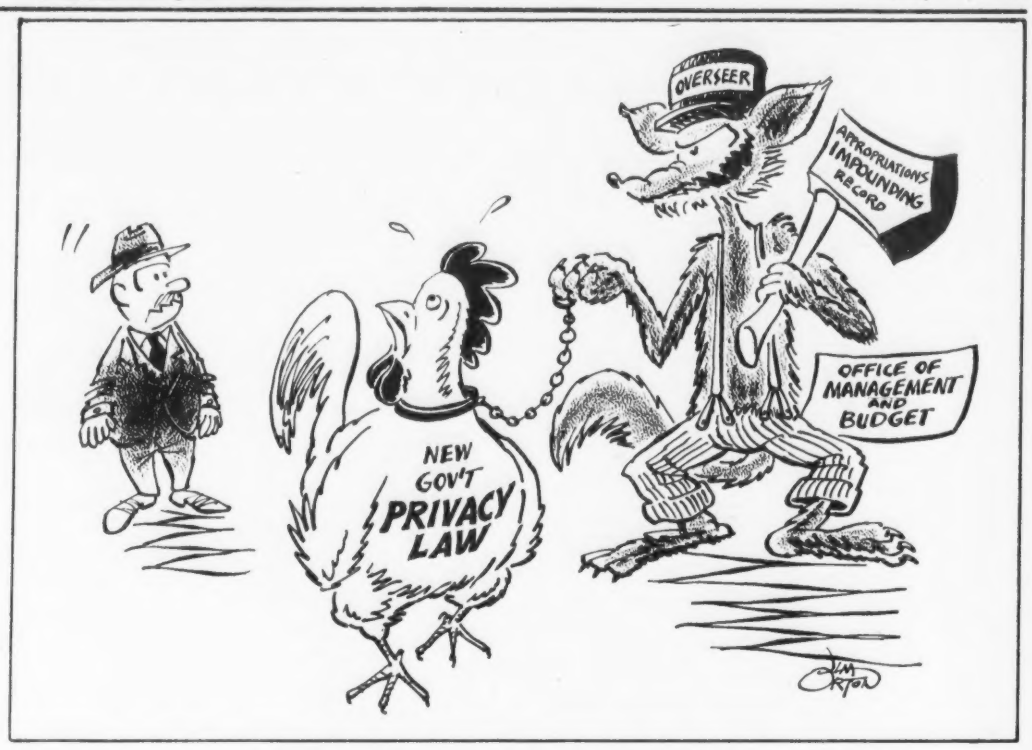
We fail to see how artificially mandated higher rates – even for a limited "market research" period – are in keeping with the interest of the public.

Stamp of Disapproval

The Postal Service ruling that DP materials are "letters" as they go to and from independent data centers [CW, Jan. 8] seems to be discriminatory, illogical, unenforcible and, as one observer summed it up, just plain stupid.

As letters, the Postal Service claims the right to handle the delivery of these materials, or at least to be paid as if the users had sent the material by mail, even if they choose to continue use of faster, more efficient alternate delivery systems.

If it is up to the user and the center to prove that the time limits were met to avoid the payments, the bookkeeping added to their regular workload will be incredible. If the Post Office has to monitor all the operations of all the users and all the data centers to find when payments are required, the overhead to that service will obviously be more than it could possible collect under this ludicrous ruling.



'Don't Worry -- I Can Handle Him'

Letters to the Editor

'Professional' Title Not Always Mark of Responsible Behavior

Practitioners of a variety of contemporary career fields, including data processing, frequently find themselves embroiled in debate as they pursue "professional" status. Those imbued with ancient Guild Hall mentality down to advocates of shamanism reject such status seeking of others with religious fervor. One must question the intrinsic value of the label "professional" before squandering one's energies in its pursuit.

One reads that 28% of all operations performed by "surgeons" were unnecessary; most of the participants in Watergate were "lawyers"; many captains of the oil industry are "engineers." Is the professional license, structured educational requirement, professional association, code of ethics and all the other trappings of professionalism a reliable quid pro quo for responsible behavior?

Too frequently the well-trained oppressor, clever conspirator or cynical manipulator of contemporary affairs cloaks himself in the ancient robes of the established professions. Who is at fault, the robe or the wearer?

Data processing as a career field is as new as today. Its practitioners are frequently adjunct to the mainstream of their parent enterprise. Does the servant fall heir to the master's faults, rise above them or ignore them? Will a certificate or license change anything of concrete value.

Let all of us in data processing pursue our careers with fervor and humanity as well as technical skill and be satisfied with the rewards of our own virtue. We are but the roots of a profession that has yet to grow into a tree, much less come to fruition. Be of good cheer; our time is tomorrow.

Vincent A. Gerbino

White Plains, N.Y.

Businessmen, Academics Need Common Point of Understanding

With all the controversy stirred by George Glaser's remarks [CW, Nov. 6] on the failure of colleges to become sensitive to the needs of industry, the comments of H.E. Tompkins [CW, Dec. 18] seem most alert and incisive. There is a need for two types of computer education in college, one oriented to theory and technology, the other to practical application of technology.

Several colleges in the last two years, like Indiana University of Pennsylvania, have announced dual curricula.

Most colleges, however, still offer computer science programs oriented mostly to engineering and math. Some of the flack Glaser's comments brought was from people who felt compelled to ardently defend computer science training, in its present form, as necessary.

Computer science, no doubt, offers some advantages, particularly in developing sound software programmers who, obviously, comprise a very small segment of the business. The major needs, however, are for programmers and analysts capable of applying computer technology to business applications.

One of Glaser's most important comments, perhaps overlooked in the passions of response, is that colleges have tended to establish a self-perpetuating cycle of creating computer scientists, rich in theory, who obviously must influence curricula but who, themselves, have little business applications experience.

Anyone viewing the data processing industry intelligently realizes that technological achievements and capabilities far exceed the abilities of people to agree on how to define and resolve problems, responsibilities and actions relating to systems projects.

Whatever answers are to be found probably lie in two related fields: communications and education. Because all companies – and colleges – in the 1970s are directly influenced by computers, there is an expanding need for colleges to provide computer science majors with strong business backgrounds and business majors with strong computer applications knowledge.

Before any meaningful communications can take place, thought patterns of both parties must be clear. There must be a common point of understanding in which a businessman can judge and control the applications he needs and systems analysts and programmers can respond to these needs incisively.

Maybe one solution is for colleges to fall out of the traditional rut of four-year degrees and into programs of whatever length to provide theory *and* applications, computer science *and* business data processing courses.

Robert S. Hoberman

Neptune, N.J.

Let's Make It a Rule

The two articles in the Dec. 4 issue concerning data processing training in Massachusetts and Kansas prisons are quite encouraging. Although there are only a limited number of persons participating in prison DP programs, this is clearly a constructive effort.

Unfortunately, DP training by itself will not solve the employment problems faced by an ex-offender. Ex-offenders need jobs – opportunities to work and build new lives. In the past, government (civil service) employment has been closed to ex-offenders, and industry has hidden behind an unchallenged argument that ex-offenders cannot be trusted in a sensitive and vital area such as data processing. These attitudes and policies are no longer valid.

The training and employment efforts of Honeywell are to be complemented and encouraged. Our society will be stronger when the Honeywell experience no longer seems like an exception.

David R. Huisjen

New York, N.Y.

(Other letters on Pages 12 and 14.)

A New Home for Standards

If there is any hope at all for computer standards – if we are ever to have a standard Cobol, a standard tape drive interface, a standard data description format – we must take the sponsorship of X3 out of the hands of the Computer and Business Equipment Manufacturers Association (CBEMA).

At best, CBEMA, and its European counterpart Ecma, functions in the standards field only reluctantly and fitfully. When guided by honest and vigorous hands, by a Charlie Phillips here or a Dara Hekimi in Geneva, some small progress is possible. But work so important should not depend nearly so heavily on the personalities in charge; it should be organized to continue when leaders retire or move on.

CBEMA is the creature of the giant manufacturers, IBM and Univac and National Cash and Burroughs and Control Data and Honeywell. They own it outright; they jerk the cords and the puppets dance – not just the CBEMA staff, but the few committee and subcommittee people who are not already directly employed by an association member.

And these giants are enemies of standards. Each fears loss of market position to the others, and especially to the plug-compatible boys and the mini wolfpack. They fear small software firms will sell packages so much more efficient than the ones they give away, that applications will run much faster, and their hardware be cut back. They regard standards, and support of X3 through CBEMA, as just one more marketing weapon: something to outwit the competitors with, something to further reduce customer efficiency.

The competitive Computer Industry Association (CIA) would be a far better sponsor, for its members – the small hardware firms, expecially plug-to-plug peripheral companies – want to hold the big boys still and chisel away at their market. But even there, each member wants its product to have a superset of the features of all competitive products, and that way lies a crazy spiral, not a standard (watch the mad escalation of minicomputer specifications)!

A better choice by far would be a user-dominated outfit such as the American Federation of Information Processing Societies (Afips). But sponsorship of X3 alone, not counting other standards committees, would cost at least $200,000 a year. That would soak up the conference profits completely, even in good years. Moreover, the National Computer Conference depends very heavily on the good will of CBEMA members. I was on the board of the NCC; I know!

I believe we need a Computer Standards Institute, supported by direct memberships of user installations, governed by its contributing members. Seed money might come from CIA or from Afips, or from a foundation, or from a congeries of existing specialized user organizations like banks or service bureaus or state governments. I believe the American National Standards Institute could be persuaded to hand over X3 to such a sponsor. We need computer standards badly; we need an honest and vigorous sponsor; we need a clean break!

Herb Grosch

Inside View of Questionnaire Questions

Shawmut Bank Seeks Guidance...After the Event

Last week the Taylor Report gave an outside view of a questionnaire sent last month to some customers of the Community National Bank. The cover letter from Edward Ward, Community president, assured people that the questionnaire was confidential and anonymous, but column readers noted that the questionnaires were numbered with the same number that appeared on the computer-generated labels, providing a tie for identifying the respondents.

The Taylor Report
By
Alan Taylor, CDP

This generated the claim that Ward had "lied" in giving the assurances. Ward's office reported that he had only signed the letter and had not actually seen the questionnaires when they were prepared, this function being handled by the bank's holding company, Shawmut Association. This fact opened up the question as to whether the Shawmut Association's DP department had made Ward a liar.

Christine Luke, manager of Shawmut Association's Market Research, had some deliberate goals in view when she designed the questionnaire. Some of the goals were related to what she suspected were blind spots or weaknesses in Shawmut policies. Others related to weaknesses in the research techniques she was using and were intended to provide a control on her results.

One of the potential blind spots she suspected was that the bank was not paying enough attention to the role of women as decision makers.

"People here interface with men for the most part," she explained. "It's very easy for them to forget the role a woman plays in making borrowing decisions. I think the role is growing – and the questionnaire will hopefully find out and prove this growth."

On the other hand, one of the weaknesses of the questionnaire method is determining what a respondent really means when he or she says they have a competitive NOW account.

"There are dozens of different plans for NOW accounts," she said. "We intend to analyze the responses to find out what attracts people to NOW accounts and for this we need to know the amount of service charges involved, the type of interest, etc.

"We can't ask this on a questionnaire, so we ask for the names of the competitive banks instead. Then we can tie the two together for our analysis."

The numbers on the questionnaires which started the furor were part of her approach to another weakness of mailing questionnaires. The responses to such items are what is called "self-selected." The respondent – not the questioner – decides whether to answer. This means that the randomness of the sample is open to question, since only the responses of those who are willing to answer the questionnaire can be measured.

Control Need Pleaded

Luke's approach was to have a complete list of all names, addresses and special sequence numbers prepared by the computer at the same time it prepared mailing labels. The labels with their numbers were used to check that the form letters signed by the nine bank presidents and the envelopes used came from the right bank, since she didn't want a customer of the Needham Bank to get greetings from a Framingham bank president.

Part of the number identified the bank, and so acted as a check on the stuffing operation. When the mailing had been sent out, the majority of the second set of 20,000 labels was destroyed. Only some 200 names and numbers were retained under lock and key.

When the questionnaires were returned they were filed under the numbers, thus allowing a computer list of numbers returned to be matched against the retained identifiable 200 sample. This procedure was used to identify the 180-or-so of the 200 who had not responded.

These 180 were then used as a control population. Their opinions were checked out by telephone to determine the impact, if any, of self-selectedness.

Luke agreed that the operation of specially stamping all the questionnaires cost money, but said she believed it was worth spending the money to gain the additional validity of the control, which she did not believe could be handled in any other way.

The explanation seemed somewhat incredible and indeed its very naivete struck me as being a strong indication of its accuracy. The fact that it did not address the question of the accuracy of the assurances given by the bank presidents, and indeed assured that some hundreds of customers would have their actual returns or their failure to return identified personnally through the use of the computer-generated number was bad enough.

The fact that no one in the data processing department had checked that two complete printouts had been provided from the records, although apparently only 1% of the records was needed for control, seemed to be an oversight, coming from an equal internal computer naivete.

However, this impression did not last too long, after I suggested an alternative way of obtaining a control population (grab 200 envelopes at random before posting). Luke's response to the suggestion was that even if she had thought of this approach, "there were other reasons which would make me stay with the method that had been used."

So the control population explanation was not the real reason for the action. In addition, the idea of Luke being a "computer innocent" proved wrong when it turned out she had been involved with some of the early 360 systems while with Dupont.

Which is where the matters stand within Shawmut at the moment.

Ward Checks Motives

Meanwhile, at the Community National Bank, the position is that Edward Ward had provided the note paper and envelopes for the cover form letters and had signed his letter, as had the other eight bank presidents. He said he believed the information in the letter was correct, because he knew he himself would not be entitled to have the respondents identified.

While he was generally aware of the computer areas, however, he handled them as he handled other items – by looking at the motives of the people who wanted to take some action or other. "As long as they don't have an evil motive," he said, "then I think it will be all right."

Both Luke and Ward acknowledged that the necessary positive action to assure that privacy could not be evaded through the abuse of the computer systems had not been taken. Moreover, both said they would be interested in reconsidering their methodology if only they could get some informed opinion. (They did not explain why Shawmut Association did not apparently expect to buy such opinions as it could easily do in the computer centers of both Framingham, where Ward is based, and Boston where Shawmut is headquartered.)

Luke said she wished there was some way in which she could assure me that no other copies of the list existed, but could think of none. She had not been in the computer room when the list was created from the live customer files and so could not tell what happened there.

That is the current position. Shawmut Association would like some guidance and I think their request deserves a response, but I would like to hear your opinions first before drafting my own response.

The important points appear to be:

- The computer area delivered to Shawmut Market Research two copies of the computer-numbered labels, *without checking that they were going to be properly controlled.*
- The market research area prepared identical letters for various presidents to sign, *without telling them more than the proposed function of the questionnaire.* They were not told of the existence of the list of numbers, names and addresses which made the accuracy of their assurances to their customers somewhat suspect.
- The first reason advanced by market research as to why the numbers were there (that there was no other way to tie the data sent in together) was later abandoned as the reason for the numbering.
- The second reason (that there was no other way to check questionnaire respondent accuracy for self-selected side effects) was later practically abandoned by market research when it admitted there were other, higher priority reasons involved.
- The individual banks do not control the operations of market research or of Shawmut Association.

With these points in mind, what guidance would you give to Shawmut Association's department, market research, Community National Bank and to their customers who may be faced with such questionnaires later. Please send your suggestions to me c/o *Computerworld*, 797 Washington St., Newton, Mass. 02160.

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Letters to the Editor

Enforcement, Not Creation, Key to Standards Problem

The page 1 article entitled "GAO Blasts Poor Documentation in Government DP Projects" [CW, Nov. 20] summarized the need for adequate documentation of computer programs as identified by the recent GAO report.

The Navy commands using the services of the Naval Command Systems Support Activity (Navcossact) to develop computer programs have had few problems in this area. Navcossact developed a documentation standard in the '60s and has participated in the adoption of essentially this same standard by all Navy, the Joint Chiefs of Staff and the Department of Defense (DOD) organizations. DOD adopted this standard in 1972.

The standard outlines 10 different documents, any one or all of which may be produced for a particular programming project. Guidelines are included for determining which of the documents are needed depending on the complexity of the programs being developed.

This same standard is being used as a basis for the work of Task Group 14 of the National Bureau of Standards in developing a proposed federal standard. It has also been one of the primary sources for the American National Standards Institute's committee X3K1 in drafting a national documentation standard.

The mere establishment of a standard does not, however, solve the problem. Management must enforce the use of the standard and must do so in a realistic manner. Overdocumenting a computer system can be as big a problem as not having enough documentation.

There must be guidelines included with the standard that provide for its modification and for adapting it to local requirements. A documentation standard must be designed to be used for a wide variety of computer hardware and software, but must provide for the use of the characteristics that are unique to that hardware and software and for the structure of the organizational environment.

P.S. Swanson

Washington, D.C.

Management Overlooks Need for Documentation

Regarding the Dec. 4 editorial "Documentation Dilemma":

Any programmer who has done very much maintenance programming realizes that good documentation is a necessary part of every program or system.

There have been many times in my career as programmer and manager when asking for or including documentation time in proposals that management says, "Get on with the next program and document later."

Another reason for lack of documentation is the government itself with all the last minute changes in required information on the myriad reports created to keep the various self-serving government departments alive.

I agree that programming money is wasted because of lack of documentation but I don't agree that programmers should take all the blame. I have yet to work where documentation is readily accepted by management as a necessary part of the system.

Ron Veerra

Spokane, Wash.

Program Documents Itself

In reference to the article [CW, Nov. 20] and the editorial [CW, Dec. 4] lamenting money wasted on government and commercial program documentation:

All this money has been wasted not just because the government pays more attention to the form of its required documentation than its content, but also because the content seldom corresponds in meaningful ways with the programs.

I've seen projects literally killed by the expense of documentation; sometimes detailed documentation is required before any implementation, leaving no money left to implement detailed designs (which couldn't possibly work anyway because they had never been coded, much less tested).

Professionals and managers fail to realize that only a program is the ultimate documentation of the program.

M.J. Viehman

San Diego, Calif.

ICCP and Licensing

Several issues raised in the Dec. 18 issue require comment.

First, in the front page article "Societies Set to Join Caravan" it was stated that the Institute for the Certification of Computer Professionals (ICCP) will give a "position paper.". The participation of the Society of Certified Data Processors (SCDP) was then noted saying "SCDP and the ICCP have been at odds regarding the future of the licensing of computer professionals . . ." As a member of the board of directors of both groups, I find the above statement inaccurate and misleading.

The omission of a topic for a "position paper" leaves the impression that ICCP will take a position on licensing. This is not the case. ICCP will discuss certification and professionalism and will say nothing about licensing.

Furthermore, I know of no official action by either SCDP or ICCP which indicates they are at odds on licensing. SCDP by direction of its membership has begun discussion of licensing. ICCP has been made aware of this direction by SCDP and as yet has not chosen to comment.

Next, the article by Ron Stewart, "SCDP Has 'Sold Out,' Deserves ICCP Condemnation," appears to be an inadequate response to the SCDP efforts. All members of the DP community should certainly be concerned about licensing, certification and professionalism. ICCP, SCDP and other professional groups would appreciate discussion and direction from the profession.

It would be wise, however, to precede such criticism by careful study of the documents and actions taken by those initiating the discussion. Rather than reading about SCDP's proposed licensing legislation, write to the society and obtain a copy for thorough study and then criticize.

I can find nothing written to substantiate Stewart's claim that ICCP had an "avowed objective" concerning licensing. Further, Ken Lord is not a director of ICCP and the Registered Business Programmer program has not been eliminated.

The argument that the absence of a public statement by ICCP would warrant the assumption of ICCP agreement or complicity to achieve "license-testing authority" and a piece of the "licensing pie" is neither compelling nor accurate. ICCP is not responsible for SCDP actions nor has it any authority to regulate the policies and programs of its member societies outside of their efforts to certify.

Stewart does make a good point about the apathy of the practitioners, societies and business community, however. With increased support ICCP could be more responsive to the issues and its influence could be felt more quickly and stronger.

Next we come to the editorial labeling the SCDP proposal as unsound. The editorial is so lacking in substantive data as to render it useless as other than an opinion.

Serious reflection will bring the realization that licensing is a viable alternative in achieving legitimacy and responsibility for the profession. However, many responsible people see several questions to answer before achieving licensing. What activities are to be licensed, how are they to be accomplished and who should be charged with the responsibility are compelling questions that require answers prior to licensing.

G. Gary Casper

Ogden, Utah

Big Brother Not DP Keeper

I would like to make two observations in response to Kenniston W. Lord's letter [CW, Nov. 13] in which he reported, with apparent approbation, on the drift toward government regulation of DP, including the licensing of DP professionals:

- The one thing we don't need now is another bureaucracy. And don't for a moment suppose that regulation and licensing, whether on a state or federal level, would not lead to entrenched and continuously expanding regulatory agencies.

Would such agencies effectively solve some of the problems (of privacy, etc.) that the DP industry is beginning to discern? Perhaps, but the history of other federal agencies demonstrates time and again that, for every problem solved, a dozen new ones are generated.

The only certain results of creating a new bureaucracy would be the raising of taxes, the strangling of initiative, a reduction of competition and a shrinking of job opportunities for those not certified.

- We needn't resign ourselves prematurely to an unwelcome fate. There may be a drift toward regulation and licensing, but they aren't yet inevitable – if those who are opposed will show a little gumption.

It may be appealing to think that we can solve all our problems by turning them over to a hopefully benevolent Big Brother in Washington, but experience has shown that it just doesn't work.

James Walker

Metuchen, N.J.

Look at Investment Return

In the article entitled "POS in Congressional Dock" [CW, Nov. 27], an aide of Sen. Frank Moss was quoted as saying, "Another question we want to raise is how an industry which allegedly has such a low profit margin can afford to make such a capital improvement, costing $15,000 per shopping lane."

Using profit margin as an instrument of measurement is very inappropriate. A much more meaningful measurement would be the return on investment which recognizes investment turnover.

It is not unusual for food retailers to experience a 2% profit margin which, when compared with heavy production-oriented industries, is frightfully low. By employing return on investment analysis which contains the "equalizer" of investment turnover, without which no one would be in the retail food industry, more accurate representation can be compiled.

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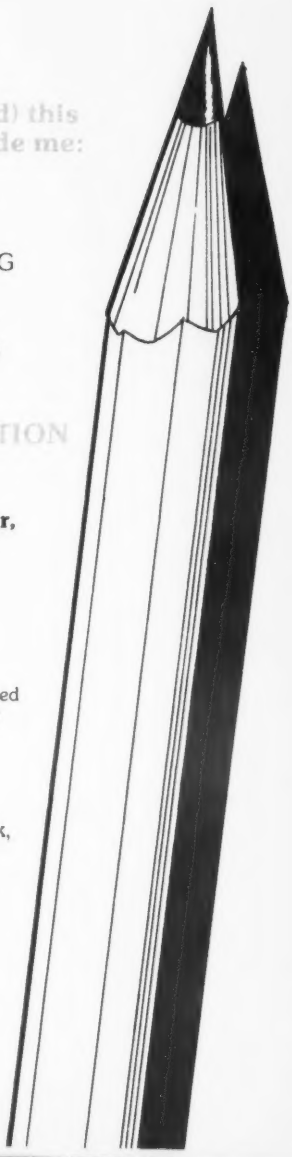

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Structured Cobol Needs 'END' Feature

By Edward Yourdon
Special to Computerworld

In order to practice structured programming in its most disciplined form, we require a language that allows:

- Blocks of simple statements (Move, Add, Compute, etc.).
- Decision groups, generally called IF . . . THEN . . . ELSE.
- Controlled exit loops, where the exit is set before the loop is entered.

The three structures are shown in Figure 1.

At first glance, it appears that Cobol does have all the features required, at least when one ignores the unpleasant bugs still to be found in some vendors' compilers. IF . . . THEN . . . ELSE are there and can be nested. PERFORM . . . UNTILs and PERFORM . . . VARYINGs can form controlled exit loops. Grouping of simple statements into single sentences provides a generally adequate, although primitive, block statement structure.

Experience over the past two years has shown that in fact these features have permitted the successful implementation of many large structured Cobol programs.

However, this is not the end of the story. The requirements of structured programming should include the ability to stop bad programs from being created, as well as permitting good ones to be written.

There are some unpleasant features in current Cobols that make the writing of structured programming unnecessarily error prone. This, therefore, is where the

Professional Practices

immediate need for changes to Cobol arises, rather than from any lack of language capability.

The two real inadequacies are the error proneness of nested IF . . . THEN . . . ELSEs and the out-of-position handling of controlled exit loops.

Nested IF . . . THEN . . . ELSEs can be seen to be error prone by considering the one-for-one apparent translation of a nested IF . . . THEN . . . ELSE in Figure 2. The translation is good on a one-for-one basis, but in Cobol logic it is wrong because C will not be performed when Q is true. The exit of the true branch of the Q loop was not explicitly controlled, as it would have been in other languages.

The fact that this is a blocking factor problem is shown by the "blocked" version of the same chart shown in Figure 3, together with a different one-for-one translation of the chart into PL/I. The structure of PL/I, therefore, gives us direct clues to the kind of improvement we would like to see in Cobol.

My suggestion is for an END statement to delimit each block of statements. This would by itself improve the situation tremendously.

The other error prone situation – placing loops away from the main narrative of the program – can also be handled by using an END statement. Thus, immediately after a PERFORM . . . UNTIL, the statements would be regarded as a block until the next END statement.

No other change in the language is needed. (It should be noted that the END capability and the in-line loop capability would be of a needed nature.)

The case for structured programming is based upon its freedom from error. Code delivered has been remarkably reliable – e.g., one bug per 10,000 Cobol is the most used real-world language and could achieve this level of reliability with the inclusion of this simple END feature.

Yourdon is the president of Yourdon, Inc., data processing educational specialists, New York.

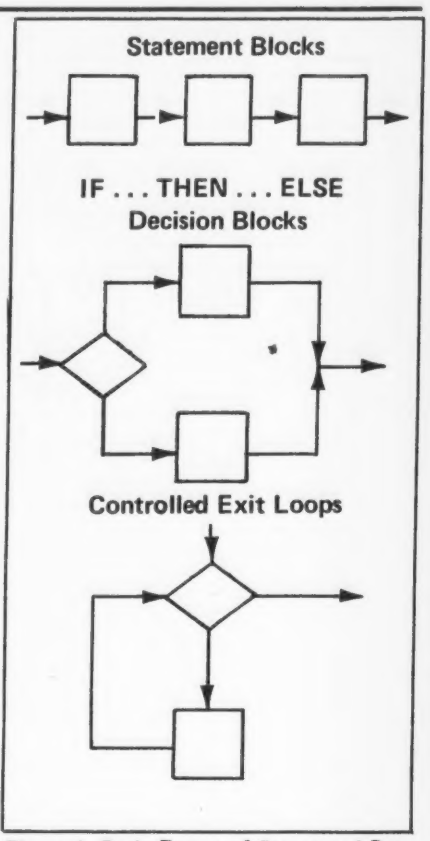

Figure 1. Basic Forms of Structured Programming

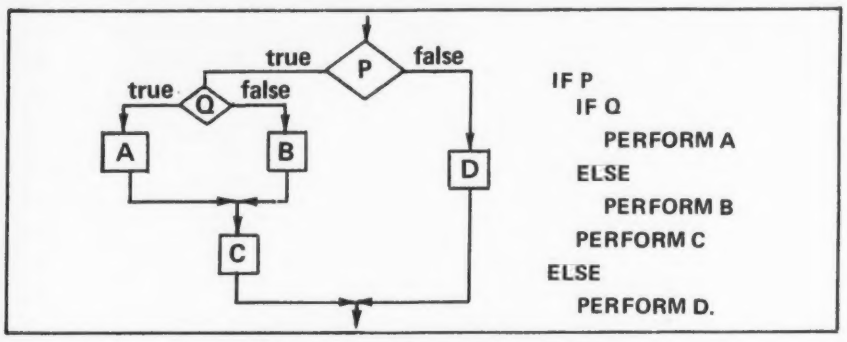

Figure 2. Error Prone Block Structures

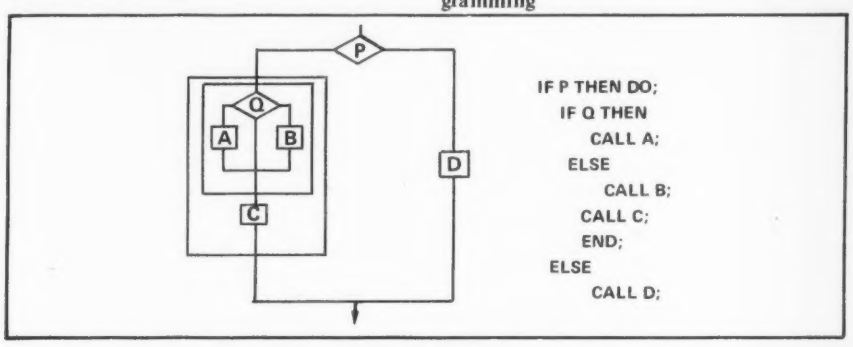

Figure 3. Alternate Block Structure

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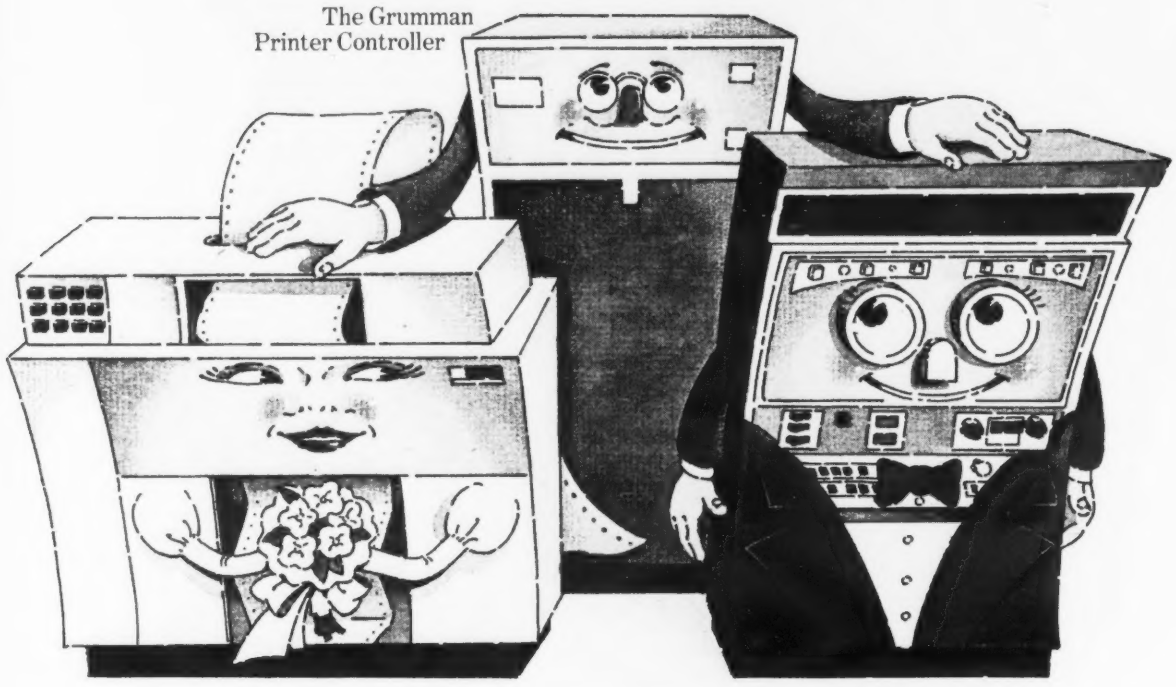

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Letters to the Editor

PL/I Language Ambiguity Results in Inefficiency

Having seen two replies to my letter [CW, Oct. 30], I feel I should respond. There is an interesting play of cross-currents in IBM computer systems development just now.

PL/I is touted for structured programming, which makes programs easier to read and understand. Yet only DO I=1 TO PLENTY could beat END or ELSE for ambiguity.

The best defined code segments, hence the clearest to document, code and understand, are independent procedures; yet PL/I encourages the use of internal procedures.

Virtual systems are painted in three colors of glory because "core" is now abundantly available. Yet PL/I defaults to AUTOMATIC and UNALIGNED variable attributes where it can, to save core. The AUTOMATIC attribute has "the added feature of occasionally throwing the programmer a bug when it reallocates core he wasn't quite finished with.

The difference in core treatment makes it difficult at times to use existing Fortran subroutines with PL/I. The attributes are good features, but not as default attributes.

I thought the "outright blast" phrase in my letter would catch somebody, and it did. My disagreement is with IBM marketing, not PL/I programming. Leasing the optimizing compiler ($) will overcome some of the nuisance items.

But END and ELSE remain as my main objections to PL/I as a language. Fortran has worse problems than PL/I, but in the process of overcoming these, some of the good parts have gone out with the bad.

END and ELSE have no meaning without reference to some other statement, and a backward reference to an unspecified location at that. Well-intended in theory, they are difficult in practice. For "Homo Programmeriens," it's much clearer to negate and repeat the condition.

PL/I's shortcoming can, of course, be skirted somewhat. Don't use ELSE, and count your ENDs very carefully, or impose a labeling scheme. And don't use constants in calls to PROCs, because the attributes may be startling when the value reaches the target. Don't use the global default, (all undeclared variables are treated as if they were in COMMON), for clarity of code context.

Instead use *PROCESS to compile all PROCs separately and EXTERNAL for items you can really justify having in a common area. Friends of virtual systems will complain about independent modules, but surely they have a tuning fork somewhere that will allow a body to run his program reasonably efficiently.

R.A. Baker

Houston, Texas

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Hard Facts for Management Provided by Monitor Use

INDIANAPOLIS – With the economy and company budgets the way they are, it is no longer possible for DP managers to make decisions based on intuition. They have to have hard facts when requesting system improvements from management.

Wesley E. Mercer, Eli-Lilly Co.'s special projects advisor, feels that management is looking only for facts and a DP operation without these facts is still operating in the cottage industry era. "We have found management very receptive to our proposals since we began collecting real information and presenting it in a professional manner," Mercer said.

To obtain real information and facts, Mercer and his group use Boole & Babbage's Configuration Utilization Evaluator (CUE) software monitor. They have been able to predict when changes would be useful, make the changes and validate the results with it.

"Maybe it has taken some of the mystery out of our operation," he commented, "but it has materially assisted us in developing DP into a true science at Eli-Lilly."

Mercer explained that the company has been using CUE on its two 2M-byte IBM 370/158s for several years. He said it has made his group extremely aware that the VS-oriented system needs continual tuning and analyzing and requires regular attention.

According to Mercer, system demand is curvilinear, and compounded rates of increase require long lead time determinations for additional acquisitions. Software measurement data provides the Lilly group with an idea of its system capacity and its position on the demand curve.

Run on Wednesdays

Mercer noted that the company runs CUE every Wednesday to develop a statistical cross-section of the system and its operation. It then compares the statistics to those from prior weeks and is able to see if system shifts, which might affect efficiency, have occurred during the period.

He also noted Eli-Lilly is presently running CUE in preparation to adding another megabyte of core. Its objective is to see on paper what the impact of the additional core will have on the system.

"Without a monitor such as CUE," Mercer explained, "we would have to rely on experience and intuition. Frankly, the days of tolerating this type of 'seat-of-the-pants' judgment have long since past – at least with our management. I should add it has also made us much more certain of the recommendations we make to management."

The company also monitors and measures the percentage of resources usage, head movement and data set placement. Mercer pointed out that data set monitoring is constant at Eli-Lilly so it can see if movements within a disk will make the performance improvements that had previously been projected.

He added that the monitoring and measurement has also assisted his group in understanding SVCs, job queues and their placement in and impact on overall system efficiency.

Mercer estimated that his system workload increases about 30% per year. By using the monitor on a consistent basis, the special projects group at Eli-Lilly is able to project for demand planning and capacity determination, and it uses all the statistical data compiled during the CUE runs to crosscheck data and add reliability to the figures.

"I don't think we have harmed our operation by removing the black box mystery from the DP area," Mercer stated. "In fact, I feel that we have improved our position with management because we provide it with soundly based information in terms it can understand and use.

"When money is tight, as it is at the present time, facts are a lot easier to present than 'gut feel,' " he said. "We've been able to and will continue to show management that we are allies – not adversaries.

"The only way we have been able to develop this cooperation and mutual understanding," according to Mercer, "is by presenting DP in a professional, scientific manner."

Nets Upgrade Service, Application

• Number Crunching Focus of Cyber 76

MINNEAPOLIS – A Control Data Cyber 70 Model 76 CPU has been added to CDC's Cybernet remote computing network, primarily to speed the processing of scientific and other large-scale work. The Cyber 76 service allows users to develop and run their own programs or to utilize a growing library of applications programs, a spokesman said.

Sort/Merge Available

The Model 76 is operating in batch mode under CDC's Scope 2.1 operating system and supports program development in Compass, extended Fortran, Cobol or Algol. Various utilities, including a sort/merge are also available to the user, the Cybernet source indicated.

The first applications available under Cyber 76 service are a nuclear reactor analysis program and the Apex III linear programming system. An engineering analysis program is nearly ready for release, the spokesman added.

Other programs, in structural analysis, nuclear fuel management and analysis, nuclear reactor safety analysis, problem description and transportation planning, are being prepared for release in the first quarter of this year, he said.

Many Terminals Usable

Although the new service requires a separate phone number to access the dedicated CPU, many of the same terminals can be used for Cyber 76 as are used with more conventional Cybernet services. Terminals suited for the service include the CDC 200 User Terminal and others that emulate it, such as the CDC 734, Cope, Data 100 and the IBM 1130 computer system.

Details of Cyber 76 and other Cybernet services are available from local offices in major cities or through P.O. Box 0, 55440.

• TSR Library Adds Bill of Materials

GREAT NECK, N.Y. – Production control of complex manufactured products up to 11 levels of detail is possible with the Bill of Materials Processor (Bomp) service now available through Time Sharing Resources, Inc. (TSR).

Utilization of the service, based on TSR's Total/APL implementation of APL, provides the user with large-scale computer capabilities accessible through simple terminal I/O commands, the vendor said.

TSR's Bomp can be used for both immediate, interactively triggered retrievals and periodic management-level reports.

Because manufactured products may involve thousands of parts, described by tens of thousands of drawings, diagrams and specifications, keeping track of these parts and controlling costs, materials and configurations is a major problem facing production management, TSR said.

Procurement, fabrication, process flow and stocking of detail parts, subassemblies and major assemblies depend upon the development and maintenance of bills-of-materials.

In addition to providing exception reports that flag troubles before they become serious, TSR's Bomp contains subsystems that provide data for failure and reliability analysis, traceability, maintainability and vendor accountability, a spokesman added.

TSR is accessible on In-Wats lines throughout most of the U.S. and on local dial-up lines through much of New England and the mid-Atlantic states.

The network is based at 777 Northern Blvd., 11022.

'Renumf' Aids Fortran Debugging Under OS

CORPUS CHRISTI, Texas – Renumbering of Fortran statements within a source deck; cross-reference listing of statement numbers, variables and syntactic elements; or resequencing of a source deck identifier are among the capabilities provided by the programming aid Renumf, according to its vendor, Comp-Aid.

Each of the capabilities is independent of the others and may be used in any combination. There is no limit to the size of the Fortran deck that may be processed by Renumf, Comp-Aid said.

The program is said to support all syntactic elements of both Fortran II and Fortran IV, along with the extensions supported by IBM and referenced in the IBM publication, "IBM System/360 and System/370 Fortran IV Language."

Renumf functions in OS and OS/VS environments only, the vendor added.

Renumbering of the source deck can start with a specific minimum number and go forward at a specified increment, or it can be done as if the new deck were a continuation of a previous deck.

Resequencing of the Fortran source deck identification entails assigning a deck identification to columns 73 to 76 and an ascending sequence of card numbers in columns 77 to 80.

The utility package can also be used to list the input source deck (prior to processing by Renumf) and the processed output deck, as well as to punch the output source or copy it onto a temporary direct access or sequential file for subsequent use as input to a Fortran compilation.

Renumf runs under MFT, MVT, VS1 and VS2 and is written almost exclusively in Fortran IV. A minimum user partition of 120K bytes is required to support Renumf, Comp-Aid said.

The package is available for a one-time license fee of $775 or 12 monthly payments of $70 from Comp-Aid at 3330 Orlando St., 78411.

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Good Code Format More Important Than Truth Table

By John R. Dischinger
Special to Computerworld

Some comments on M.D. Paterson's comments [CW, Dec. 11] on J.D. Omlor's "Truth Table" technique for debugging nested IF statements [CW, Sept. 4]:

Paterson might be doing an apples and oranges number by offering clean formatting conventions as an alternative to a debugging technique. In fact, Omlor's table method is equally valid for clean and dirty coding structures.

Nonetheless, that formatting standards be stressed is a point well taken.

Here are five excellent structured program formatting conventions which hath charms to

Rebuttal

smooth the nested IF:

(1) A line of coding includes only one verb.

(2) ELSE occupies a line by itself.

(3) ELSE has the same indentation as its corresponding IF.

(4) The set of statements subordinate to the satisfied condition(s) of an IF construct is indented.

(5) The set of statements subordinate to the unsatisfied condition(s) of an IF construct has the same indentation as its corresponding IF.

Now, using Paterson's example [let "IS" = Imperative Statements]:

```
IF(1),
 IF(2),
  IF(3),
   IS,
  ELSE(3) IS,
(ELSE(2) IF(4),
   IS,
  ELSE(4) IS,
ELSE(1) IS.
```

We find that by not applying rules (1) and (2) and by conceding the existence of a mythical "ELSE IF," we are forced to violate rules (3), (4) and (5). The same example, heeding the rules, would look like this:

```
IF(1),
 IF(2),
  IF(3),
   IS,
  ELSE(3)
  IS,
 ELSE(2)
 IF(4),
  IS,
 ELSE(4)
 IS,
 ELSE(1)
 IS.
```

[Note that IF(4) is the set of imperative statements subordinate to IF(2) in the unsatisfied state and by rule (5) has the same indentation as its IF.]

Also, Paterson says, "Bear in mind that only one set of imperative statements can be performed in a pass." While in a sense this is a true statement, a distinction should be made between the non-nested IF, which contains no defined imperative statement subsets, and the nested IF, which can have many executable subsets.

As Dennis Omlor points out, "To the novice, an IF is not an imperative statement, but actually it is." Thus, nesting IFs results in multiple sets of imperative statements all of which can be executed in a single pass.

Slightly expanding our example quickly makes this evident:

```
IF(1) A =A,
 PERFORM V,
 IF(2) B = B,
  PERFORM W,
  PERFORM X,
  IF(3) C = C,
   PERFORM Q,   ] set(3)
   PERFORM R,   ]        ] set(2)
etc.                              ] set(1)
```

We see, then, that imperative statement sets (1), (2) and (3) [set (3) a proper subset of set (2); sets (2) and (3) proper subsets of set (1)] will all be accomplished in a single pass.

Since in a nested IF, the imperative statement set combination that will be executed depends upon the true-false condition(s) of the respective IFs, Omlor's truth table approach could on occasion be handy. I feel, however, as does Paterson, that most nested IF difficulties could probably be unsnarled long before a complete truth table could be constructed.

Dischinger is a technical specialist, residential DP, with Honeywell in Minneapolis, Minn.

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Enhanced 'Splice' Takes ANS Cobol

HUNTINGTON, N.Y. – The Shorthand Programming Language in a Cobol Environment (Splice) precompiler from Crawford and Grauer Associates can now accept ANS Cobol statements as input.

This enhancement means the package, designed to speed development coding, can also be used for maintenance work.

Splice includes seven features to reduce coding. Support for procedure division, data division and user-defined abbreviations and one-line identification division write-ups are among the simplest.

Creation of file definitions within the data division, creation and initialization of 77-level entries and support for relative addressing, rather than unique data names, to reach given fields are "slightly more involved," the vendor admitted.

Splice uses 20K bytes of memory under IBM's DOS and is available for a yearly rental fee of $1,200.

Written in Assembler, the precompiler can be used on IBM and Univac Series 70 CPUs. Crawford and Grauer Associates is at 10 Surreyhill Place, 11743.

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CW 175

Cosmic Package Exercises H635

ATHENS, Ga. – Installations with GE (now Honeywell) 635 systems have an opportunity to exercise and monitor various functions in an orderly manner with the GE 635 System Certification package from Cosmic.

Ten areas of hardware/software operations are checked by the system which was developed at Kennedy Space Center. The first area exercised is the console, which is tested almost by default as operator set-up messages are printed.

The first of a pair of routines punches a deck of cards to check all row and column positions. The reader routine does the actual checking of the punching while in effect testing the reading function itself.

Other routines individually monitor the basic operations of the user's drum, disk, printer, auxiliary typewriters and tape drives. A paper tape test provides only an allocation check.

Another routine checks for error conditions when the I/O channel is loaded with data from simultaneous drum, disk, tape and punch operations.

This library of test programs is 70% Fortran and 30% Gmap. It includes approximately 550 card images, is cataloged by Cosmic as KSC-10452 and is available immediately for $300.

Documentation is sold separately for $7.50, a Cosmic spokesman said from 112 Barrow Hall, at the University of Georgia, here in Athens.

Tektronix Upgrades 'Plot-10' Software

BEAVERTON, Ore. – An enhanced version of Tektronix's Plot-10/Terminal Control System (TCS) for Digital Equipment Corp. PDP-11 DOS users with 24K of core memory supports the Tektronix 4010 family of terminals, including the Enhanced Graphics Module (EGM) available on the 4014 and 4015 graphics terminals.

The update is written in ANS Fortran IV and PDP-11 Assembler Language. Included are subroutines allowing the user to select any of the four character sizes available on the 4014, and a new routine to use an assortment of dashed lines and focus and defocus lines. Write-through mode is also provided, a Tektronix source said.

An earlier version of Plot-10/TCS will still be available for customers who do not need the EGM support and who want to take advantage of the earlier product's faster execution time and smaller – 16K – core requirement, the spokesman added.

The enhanced Plot-10 package, including user manual and source code on paper tape or Dectape, is available from Tektronix for $575 through P.O. Box 500, 97005.

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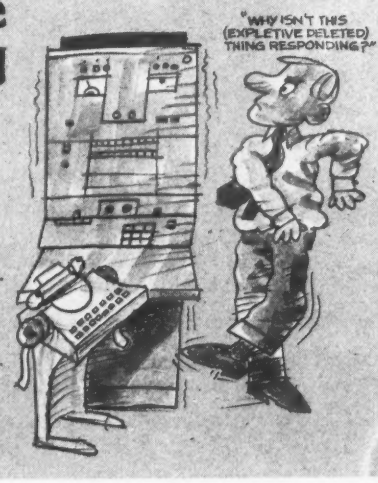

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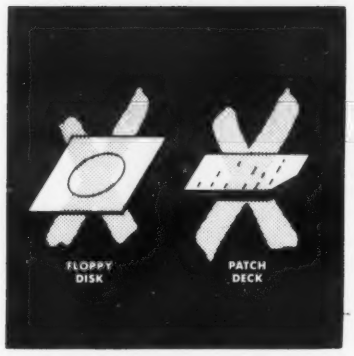

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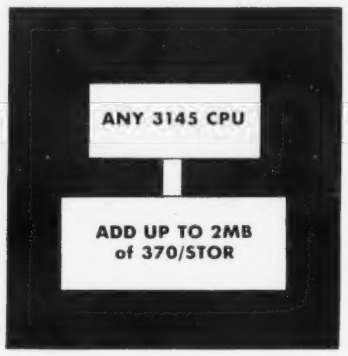

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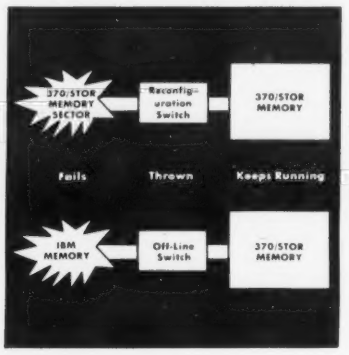

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Chicago – Jun. 2-3
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Understanding of Manuals Vital to Abend Debugging

By Lewis L. Copley Jr.
Special to Computerworld

Harmon Feig's rebuttal [CW, Dec. 11] to my earlier "Register Contents at Entry to Abend Not Preferred for Debugging Work" [Sept. 11] is without merit.

Feig's quote from my article is inaccurate. It should read "The registers at entry to Abend . . . good fortune" rather than "The registers at Abend . . . good fortune."

This error is not surprising, as Feig seems to have a problem in reading his own references. I refer specifically to his statement that in IBM Field Engineering Handbook (order number 229-3169-1) "register 2 contains the address of the DCB for Open and Close system interruptions."

The reference indicates only register usage by some of the various OS components, with no mention of contents or usage either at entry to or during System Interruption.

Additionally, that particular reference is an outdated manual; it has been superseded by IBM Field Engineering Handbook (order number 229-3169-3). The information formerly found on page 42 is now on page 63 with a note indicating that register 2 does not always point to the DCB for Open, Close and EOV.

Feig's rebuttal does not address that which he wished to address – i.e., register contents at entry to Abend. Nor does he, in fact, even address register contents at entry to Open, Close and EOV.

This is evident by his references to the IBM Field Engineering Handbook and to the IOS PLM for Open/Close/EOV. Both examples refer to register usage, not register contents at entry. There is a significant difference.

A load module (in this case Open, Close and EOV) can, once control is gained, manipulate the registers in any way it so desires (assuming that OS conventions are maintained); this represents register usage. However the register contents at entry to that load module must point to the viable information required.

The contents of registers at entry to Open, Close and EOV are not necessarily maintained by those modules, as Feig would lead one to believe.

Had Feig read the entire article for which his rebuttal was offered, he would have learned that a later article, "Register at Entry to Abend No Help in Debugging" [CW, Sept. 25], would review "why . . . the registers at entry to Abend are unsatisfactory for debugging."

Rebuttal

I must also take exception to Feig's statement that his "techniques . . . are . . . used throughout IBM manuals." Since we are in agreement that the general topic is debugging, he would be well advised to review the IBM manual entitled *Programmers Guide to Debugging* in which it is written:

"REGS AT ENTRY TO ABEND

"Identifies the next three lines as the contents of the floating point and general registers when the abnormal termination routine received control . . . These are not the registers for the problem program when the error occurred."

Feig must certainly realize that Open, Close and EOV execute as "problem programs" envoked via the OS SVC facility. As such, the registers at entry point to parameters necessary for these resources to execute. The registers at entry to Abend exist to serve the Abend resource only.

The registers printed under the heading REGS AT ENTRY TO ABEND are merely a duplication of the registers printed under SVRB 13 in the Active RBS of an OS dump. The ability to equate possible usage with contents at entry by observing the RB relationship and PSWs continues to elude me.

'Antiquated' Technique

Feig's assertion that his method is widely used may be accurate. If so, many individuals are using a technically unsound approach and, at best, an antiquated one. From the standpoint of their technical accuracy, the statements in my earlier articles will stand.

Incidentally, the discussion of debugging methodology to be used for Open, Close and EOV is, for the most part, of no concern to the user with OS Release 21 or later. The messages and codes do the job rather nicely.

Copley is a member of Prudential Insurance Co.'s corporate computer systems and services office in Roseland, N.J.

'Expert' Leads Course

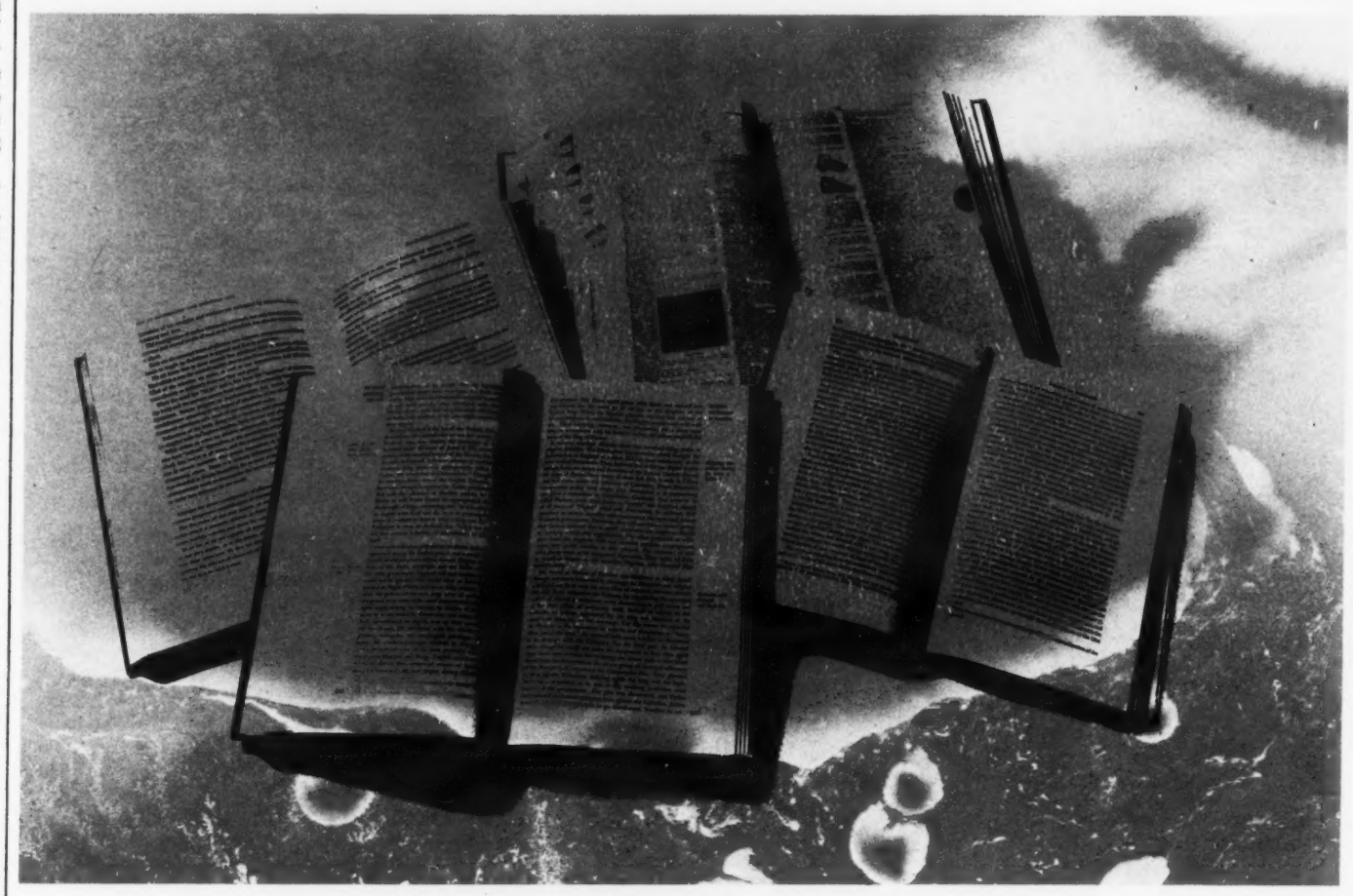
ARLINGTON, Va. – Brandon Applied Systems, Inc. may have gone to unusual lengths to provide the voice of experience for a course it will sponsor on information processing security.

Jerry N. Schneider, who was arrested and recently ordered to make restitution for a computerized theft of equipment from Pacific Telephone and Telegraph Co. in Los Angeles [CW, Dec. 11], will be the principal instructor of the course entitled "Managing the Security of Information Processing."

The three-day course will investigate all facets of computer security. Both electronic and physical security will be discussed.

The first course will be held in New York City on Feb. 19-21.

Further information on the course can be obtained from Brandon at 1611 N. Kent St.



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Between 1946 and 1952, the 10-word memories of the early computers increased to 80, then 1,024 words with the introduction of Dr. John von Neumann's IAS computer.

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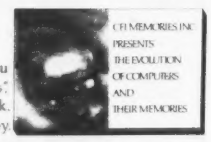

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COMMUNICATIONS

Data Briefs

Two LSI Modems Feature Remote, Local Diagnostics

WILTON, Conn. – General Datacomm Industries, Inc. is offering two LSI modems with local and remote diagnostic features.

Designated GDC 201-9, one modem operates at 2,000- or 2,400 bit/sec in half- or full-dupex mode over either unconditioned two- or two-wire private lines or the dial-up network, the firm said.

Compatible with the Bell 201A, 201B or 201C, this modem can be used in either point-to-point or multipoint applications.

The company noted that the 201-9 is available for rack mounting at the computer site or as a stand-alone, single-channel subset for remote locations. With Analoop and Dataloop diagnostics, the device is said to analyze each individual remote location with respect to terminal, modem or private-line failure.

The GDC 201-5 modem operates on the dial-up network through Bell automatic originate and answer data couplers CBS (1001A) or CBT (1001B) at rates of 2,000- or 2,400 bit/sec, according to the firm.

Also available in rack mount and stand-alone configurations, the 201-5 is said to avoid two costly operating characteristics common in dial-up 201-type modems.

Delivered within 30 days after order, the 201-5 sells for $1,331 and 201-9 is priced at $1,216. The firm is located at 131 Danbury Road, 06897.

Modem, Coupler Interfaced to TTY

PHOENIX – Omnitec Corp. has released a modem and an acoustic coupler to interface with teletypewriters.

The Model 4500 Omni-Datx data modem directly replaces the Bell 101C data set, according to the company. Operating over the dial-up telephone network at a rate of 110 bit/sec, this unit is said to mount directly into a teletypewriter.

With two-wire, half-duplex operation over the dial-up network, the 4500 interfaces to the telephone line via a Bell CBT data access arrangement and provides full automatic answer capability for unattended operation, the firm added.

The company noted that the unit also provides power to the CBT, thus eliminating the need for a telephone company supplied power source.

Calls can be manually terminated through a control panel switch, but the 4500 will automatically terminate a call if no answer occurs within 10 seconds.

The company has also introduced the Model 501A acoustic coupler which is designed to interface with the Model 33 Teletype in remote computer time-sharing systems.

With a rate of 110 bit/sec, this unit is said to feature half- or full-duplex switching, a carrier indicator light and an impact resistant case and integral acoustic barrier.

The coupler sells for under $150 in OEM quantities, and the modem is priced at $625. Delivery for both units is immediate from the firm at 2405 S. 20th St., 85034.

Correction

AT&T Dataphone Digital Service (DDS) rates between Waltham, Mass., and New York [CW, Dec. 25-Jan. 1] apply at transmission speeds of 9,600 bit/sec.

The rate at 2,400 bit/sec would be $90/mo plus 60 cent/mile for the type 2 Digital Access Line for the 12 miles between Waltham and the Boston DDS hub office. In addition, the user would pay $20/mo plus 40 cent/mile for the 189-mile link between Boston and New York.

Magnetic Stripe Stores Basic Data

Bank Passbook System Based on SDLC

By Ronald A. Frank
Of the CW Staff

NEW YORK – One of the first IBM terminal systems to utilize Synchronous Data Link Control (SDLC) will become operational this month at the Dry Dock Savings Bank here.

The transmission protocol will be an integral part of a 115-terminal passbook banking system being installed in 11 locations in the New York metropolitan area by the bank. The terminal network will include the 3600 finance communication system with local controllers and a 3705 front end at the central site where dual 370/145s are installed.

From the customers' standpoint, the key to the terminal system will be the appearance of a magnetic stripe on the inside cover of the conventional passbook, according to John W. Petrusky, senior vice-president. The main reason for the stripe is to save the teller from keying in basic information about the customer's account.

The stripe includes more than 40 alphanumeric characters of information with the account number, current balance and "line number" recorded on a real-time basis each time the passbook is presented for a transaction, Petrusky explained. During the conversion phase passbooks will get a pressure-sensitive gummed stripe affixed.

The stripe is a "210 bit/in." read/write field designed by the bank since there is no current standard for passbook stripes, he said. The line number tells the system what the next line should be printed on, and the updated balance and account number help to avoid keying errors.

"The teller will be required to key in only the transaction amount and indicate to the system the type of transaction," Petrusky said, and the net effect of having the data read directly from the stripe will "decrease the teller keying time by more than two-thirds."

Under the current terminal system used by Dry Dock Savings, one terminal was shared by two tellers. But with the new 3604 terminals each teller will have his own display workstation.

"If a person has a no-passbook transaction there will no longer be contention between two tellers attempting to use the same machine," he said. The only device to be shared will be the 3612 printers which update the passbook totals and the magnetic stripe.

Each bank location will include a 3601 controller that batches daily totals and communicates at 1,200 bit/sec with the 3705 front end at the central site. The front end will use SDLC operating under the Virtual Telecommunications Access Method (Vtam) and the Network Control Program (NCP). Each transaction will access the account data base in the 145 in an on-line mode and about 250,000 accounts will be available in the system.

Terminal Transactions

The 3601 controllers will handle teller proof and ledger proof totals and will transmit the data on demand to the 145.

"Most of the local processing will remain at the branch," Petrusky said. This includes printing, check digit calculations and editing, which will all be unloaded from the CPU and put into the branch controller.

In case of malfunctions on the private-line network, the bank has a dial backup capability to restore communications with the 145. If the dial-up lines also fail, then the controllers at each branch could function independently.

A major non-IBM component of the banking system is the Intertel modems that handle transmission of data between the branches and the DP center. The installation includes an Intertel Network Control System which has the capability to isolate transmission problems from a central diagnostic center. It also will provide dial backup capability.

In addition to its own branches, the Dry Dock DP center also processes the transactions of other banks. At least one of these will also be converting to a 3600 system but the 3705 also handles non-IBM terminals operating in binary synchronous mode under Btam.

Among the other terminals being supported are NCR, FDSI and Olivetti equipment. Before the installation of the 3600 system, the bank used IBM 1060, 2980, Olivetti TC380 and FDSI terminals.

Costs of the new system are difficult to quantify because the entire system is being enlarged and upgraded, Petrusky said. In general, the cost of the 3600 system "is comparable" to what the bank now pays on a per terminal basis, he estimated.

Dial-Up Simulator Eliminates Data Sets, Telephone Lines

EL SEGUNDO, Calif. – Computer Transmission Corp. has introduced a dial-up data set simulator designed to eliminate both data sets and telephone lines. It is said to provide direct, low-cost service between local terminals and mainframes or communications devices.

Called Connectran, this device functions under operator control to link a central CPU, concentrator node, packet node or multiplexer with a terminal located within a range of up to 1,250 feet, via 11-pair twisted cable, the company said.

Emulating all originating and answering data set functions while accommodating data rates up to 9,600 bit/sec, Connectran is said to do away with the need to route data traffic through Centrex, PABX or PBX facilities.

The firm said the device is particularly intended for those facilities which have a number of supervisory or nearby user terminals, where each terminal is accommodated by a telephone line to the CPU and dual data sets because the software and front-end processors are supporting dial-up protocol.

Cable-Connected

In a typical operation, Connectran replaces an acoustic coupler at the terminal site and the dial-link and associated automatic answering data set at the computer, according to the firm. The unit is cable-connected directly to the mainframe or the multiplexing device serving the CPU.

A series of lights on the device's front panel provides the terminal operator with status information. The company noted that the operator pushes a button to gain access to a computer port and that the operator pushes a button to gain access to a computer port and that the same operation also notifies the operator if the port is busy.

Connectran is said to simulate acoustic couplers and data set models such as the Bell 103E, 103A2, 113A/B, 202C or their equivalents, and the 202D with 804 dialer.

Self-contained in a stand-alone unit, the device is designed for desk-top use or for mounting on the side of a terminal.

Prices for the dial-up data set simulator start at less than $300 and delivery is 30 to 45 days from the firm at 2352 Utah Ave.

AT&T to File New DDS Tariff

By Ronald A. Frank
Of the CW Staff

NEW YORK – AT&T plans to file a new tariff for the 19 higher priced Dataphone Digital Service (DDS) cities in May to begin service in June, an AT&T spokesman said. The first cities to be connected in the 19-city group will be Newark, N.J. and Baltimore and these will be ready for service in June.

This will be followed by Pittsburg, Cleveland and Detroit about a month later. After that four cities will be added to the DDS network monthly until the authorized 24-city network is operational in October 1975, the AT&T spokesman said.

AT&T has not yet resolved discrepancies in the FCC's recent DDS ruling [CW, Dec. 25-Jan. 1]. Such questions as the DDS rates that will apply in the 19 additional cities at 56 kbit/sec will not be resolved until the further AT&T filing, a Bell spokesman said. The 56 kbit/sec rate has no comparable price in Tariff 260 and the recent FCC ruling said that the 19-city rates could be no higher than the levels for private lines now in effect.

An FCC spokesman said the rate for 56 kbit/sec would have to be comparable to Series 8000. "We would consider a rate similar to 8801 lines as a comparable charge, an FCC staff spokesman said. The Series 8000 rates apply to 50 kbit/sec but this would be considered a good comparison.

Another question on the DDS rates concerns service between the original five cities and one of the 19 additional cities. In such cases, the higher 19-city rate will apply.

The net effect is that lower DDS rates will apply only for service in the original five-city area. Whenever service on a particular link includes a city in the 19-city group, the customer will have to pay the higher charges.

The two-tier pricing for DDS took effect on Dec. 16 and will expire in 12 months. During that time the FCC will hold hearings designed to evaluate the long-term effect of the DDS rates.

AT&T was scheduled to file its supplemental case in this hearing on Jan. 6.

The docket number of this hearing is 20288 and thus far about 20 firms and industry organizations have indicated to the commission that they intend to participate. These include CML Satellite Corp., Computer and Business Equipment Manufacturers Association, Data Transmission Co., Independent Data Communications Manufacturers Association, MCI Telecommunications Corp., Packet Communications, Inc., Southern Pacific Communications Co. and Telenet Communications Corp.

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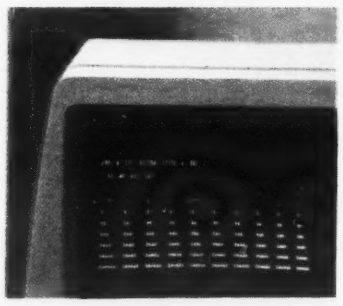

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NCR Terminals, IBM S/3, S/7 Link Retail Chain

READING, Pa. – A small clothing store chain in southeastern Pennsylvania has combined NCR terminals, an IBM System/7 and an IBM System/3 into a data base management system.

By taking advantage of the communications capabilities of the S/7 and the RPG processing features of the S/3 Model 10, Bobbi Rogers Industries has configured a private-line network that handles 30 NCR 280 POS terminals in 24 stores and performs inventory control, sales reports and similar functions.

The terminals are polled by the S/7 for each transaction with software written in Assembler and using an interface to the NCR terminals developed by IBM, according to Dr. Jeffrey Pearlman, vice-president for DP at Bobbi Rogers. The S/7 utilizes the IBM Teleprocessing Multiplexer Module and NCR 752-200 1,200 bit/sec data sets.

Transaction data collected on disk by the S/7 is transferred manually to the firm's S/3, where it is run using a series of RPG programs developed by Bobbi Rogers.

According to Pearlman, the heart of the system is a modulus eleven stock keeping unit (SKU) which identifies store items by size, color, type and vendor. The SKU system reduces data entry errors since only certain numbers can be entered at the terminals, he said.

The RPG programs process the terminal data on the S/3 and provide such edits as missing transactions, openings and closings, invalid voids, uninterpretable transmissions and other transaction data.

The S/3 software includes "about 50 programs," according to Pearlman, and reports that can be generated include velocity index information, sales and inventory data summary reports and other information of interest to management.

The entire S/3 data base package and interfacing capability for the S/7 is available for $5,000 from Bobbi Rogers at 1265 Perkiomen Ave., 19602.

Terminal Transactions

Interactive Graphics Terminal Operates With PDP-11/40, 45

MAYNARD, Mass. – A low-cost interactive graphics terminal designed for use with multiuser computer systems has been introduced by Digital Equipment Corp. (DEC).

Designated the EG-11, the terminal operates with PDP-11/40 and PDP-11/45 computer systems and provides Fortran IV-compatible graphics capability when used with DEC's multiuser RSX-11 software. This enables users to perform graphics applications concurrent with other computer operations, the company said.

Designed primarily for engineering applications, the EG-11 provides the power and speed of a PDP-11 time-sharing computer at a cost significantly below that of stand-alone interactive graphics computer systems, DEC said. The EG-11 can be used to provide visual solutions to kinetic problems as well as for graphical applications in design and planning.

The EG-11 consists of a 17-in. CRT monitor, a hard-wired display processor unit, light pen and Fortran-IV graphic extensions. The system can be used in minimum RSX-11M configurations. The RSX-11 software packages are multiuser resource-sharing systems for use with PDP-11 computer systems.

A typical RSX-11 system with 24K words of memory can accommodate a single EG-11 terminal in addition to its normal complement of peripherals and alphanumeric consoles.

A PDP-11 with 64K words of memory, 40M words of disk storage and an RSX-11D or M operating system can support up to four graphics terminals along with other peripherals and consoles. This configuration allows multiple applications programs to be run in parallel with interactive sessions at all graphics terminals.

The EG-11 terminal costs $10,000 and is available on a 90-day delivery schedule.

Two Remote Batch Units IBM 2780-, 3780-Compatible

MINNEAPOLIS – Two versions of a remote batch terminal manufactured by Data 100 Corp. provide users with IBM 2780 and 3780 terminal compatibility.

Both variations of the Model 76 are said to feature a 210 line/min printer and to be capable of operating medium- and high-speed peripherals as well.

The standard configuration of the Model 76 comes with a 150 card/min reader and the 210 line/min printer, the company said.

But the terminal is also designed to handle input speeds of 450-, 600- and 1,000 card/min and to accommodate line printers of 400-, 600- and 1,250 line/min, according to the firm. In addition, users wishing to upgrade their installation further can add a 59- to 200 card/min card punch to the terminal.

While prices vary depending on the peripheral speeds selected, the standard configuration costs about $20,000 or leases for $260/mo on a one-year term, including maintenance.

Deliveries of the terminal are scheduled to begin this month from the firm at 7725 Washington Ave. S., 55435.

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Siemens Offers Teleprinter 100 For Telex Network

ISELIN, N.J. – A heavy-duty terminal for Telex operation via the Western Union network can be obtained from Siemens Corp.

Available to all Telex users, the Teleprinter 100 is said to be capable of 24 hour/day operation with no overheating. It comes with either a three- or four-row keyboard, an automatic tape reader, a tape punch unit (ASR) and a two-color printing device.

Comparable in size to an office model electric typewriter, the terminal uses the standard CCITT Alphabet No. 2 and operates at 66 word/min, the company said. The firm noted its device is also available at higher speeds for leased line applications.

The Teleprinter 100 can be purchased outright for $3,101 or leased on a three-, five- or 10-year basis with purchasing options.

Teleprinter 100

The device leases for three years at $107/mo and can be bought for $300 after three years; for five years at $72/mo, with an option to buy the terminal after that time for $300; and for 10 years at $62/mo, with a purchase price of $1 at the end of that time.

The unit is available on a 30-day delivery schedule from the firm at 186 Wood Ave. S., 08830.

MCI to Expand Private Service To LA, Other Western Cities

NEW YORK – MCI Telecommunications Corp. announced today it will expand its communications service to Los Angeles and three other major western cities by the end of the year.

This expansion, which is subject to approval by the Federal Communications Commission, is the result of an agreement signed with Western TeleCommunications, Inc. (WTCI) under which MCI will operate WTCI's business communications terminal facilities in Los Angeles, San Diego, Phoenix and Tucson. MCI will utilize WTCI long-haul transmission capacity among these cities on a revenue-sharing basis.

MCI currently offers private-line services on a network stretching from New York and Washington, D.C., to Chicago and Dallas. A company spokesman said MCI has also constructed transmission facilities from Texas to New Mexico, and that MCI plans to extend this construction further westward so that it can be linked to the WTCI system at Phoenix.

This interconnection would permit MCI to offer coast-to-coast service over facilities under its own operating control, a spokesman said.

Data Base Lists Net Optimizers

RAMSEY, N.J. – A data base for private-line communications network optimization programming has been released by the Center For Communications Management, Inc. (CCMI).

The Hi-Lo Rate Center Listing permits the retrieval of over 29,700 records by area code and telephone exchange number, thus eliminating the look-ups required in most network optimization systems, the firm said. Each record includes the rate center (city and state) assigned for the local exchange, the vertical and horizontal coordinates of the rate center and time zone and Daylight Savings codes.

In addition, each telephone exchange designated "low density" under AT&T's new Hi-Lo private-line rate structure includes all assigned "homing points" (high density rate centers through which private-line services may be routed).

CCMI's Hi-Lo Rate Center Listing file is available on either 800- or 1,600 bit/in. 9-track Ebcdic magnetic tape. Block length is 10 records of 160 characters each.

The price is $2,500 for the initial file, with updating service available semi-annually at $400/update. The company can be reached through Box 324, 07446.

CBT-Type Data Coupler Connects Dial-Up Lines

WATERFORD, Pa. – An automatic CBT-type data coupler for connecting customer-provided automatic data equipment to dial-up telecommunications networks is available from Elgin Electronics, Inc.

Designed to isolate customer equipment, the Model EDC 1001D assures protection of equipment from metallic and longitudinal surges in excess of 50 V occurring on telephone facilities, according to the company.

The coupler is said to provide both the Data Access Arrangement (DAA) and the Network Control Signaling Unit.

Other features include automatic linear control of signal levels above specified thresholds and the capability to detect incoming ringing signals to permit customer operation in unattended answering mode, the company said.

The unit also includes manual remote test capabilities.

Designed for wall mounting, the coupler sells for $120 from the firm at Walnut St., 16441.

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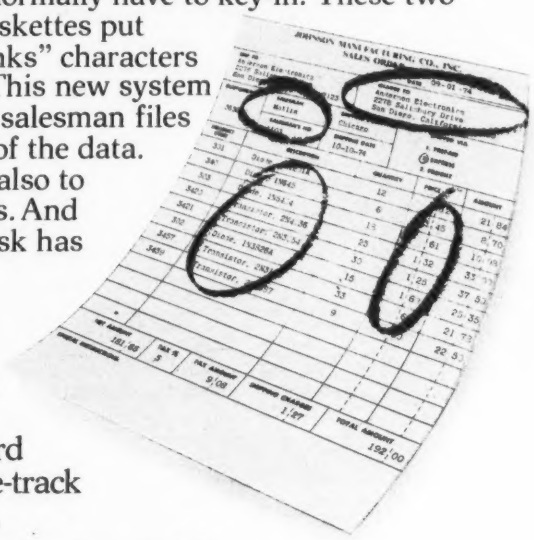

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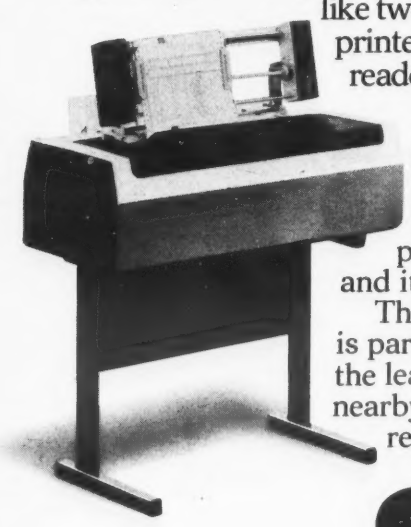

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Canada Developing Mobile Terminal For Police Use

By T.M. Whiteman
Special to Computerworld

OTTAWA – A move is being made here by the Federal Government's Department of Communications and the Royal Canadian Mounted Police to give each patrolling constable direct access to a central computer via a special mobile police data terminal, replete with mini keyboard and small printer or CRT.

Under current police procedure, the police car radios a central police dispatch, which obtains the information from the central police computer and then relays it back to the patrol car. The new standardized mobile radio data terminal to be developed in this special project will eventually eliminate the need for the radio dispatcher to act as a middleman for inquiries directed to the computer from police cars.

The two-year program is scheduled to design, develop and produce a prototype to satisfy the major requirements of all Canadian police forces.

Government officials say that the mobile terminal could also be incorporated into computer-aided dispatch systems, which permit high-speed digital signaling to replace routine voice messages between police cruisers and dispatchers.

The project is part of an ongoing research and development effort at the Communications Research Centre and is concerned with stimulation of Canadian industrial activity in the data terminal field.

Line Driver Operates Up to 300 Bit/Sec

WILTON, Conn. – Designed for use in line driver/cable driver applications, a low-speed frequency shift keying modem is available for point-to-point and multipoint operations from General Datacomm Industries, Inc.

Operating at rates up to 300 bit/sec, the GDC 108 line driver is both compatible with and designed for applications requiring the functions of the Bell 103F and 108 modems, according to the firm.

Available for use at the computer or concentrator site (GDC 108-1A) or as a stand-alone unit for terminal applications (GDC 108-2A), the modem comes in a rack mount unit for both of these originate-only and answer-only models as well (GDC 108-1AR and GDC 108-2AR, respectively).

The company noted that the line driver operates full-duplex over two-wire or four-wire circuits with standard EIA RS-232 or current loop interfaces.

Consisting of a single printed circuit card, the device is said to include transmit/receive functions, interface and power supply.

The list price of the basic rack mount version of the line driver is $215, and the device can be obtained from the firm at 131 Danbury Road, 06897.

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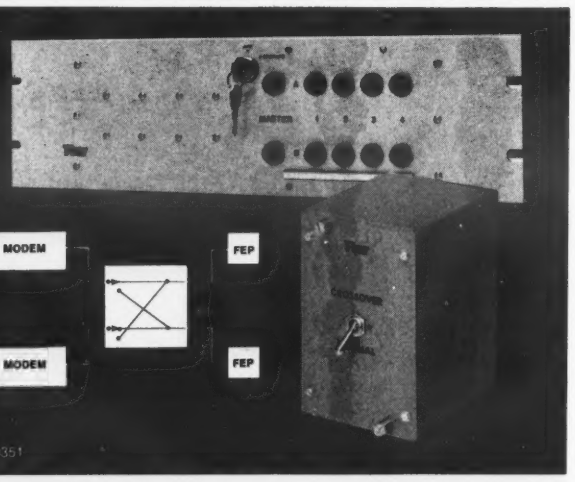

T-Bar Cross Over Switches are available in configurations with 2 and 4 paired channels and come with three basic controls: Manual, Local; Computer and ASCII Unattended Remote, for either rack or wall mounting.
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Bits & Pieces

Gould COM Unit Gets Expanded Capability, Operator Console

NEWTON, Mass. – Gould, Inc. has expanded the capabilities of its Beta COM 800 and added an operator console to all its programmable computer output microfilm (COM) systems.

For the Beta COM 800 high-resolution system, the L-shaped console contains a tape drive and formatter, formerly housed in the unit's left bank, and an I/O terminal.

Additional space is available for optional equipment, such as a 1.6M-word disk cartridge or display monitor.

Relocating the tape drive and formatter to the console provided room in the COM unit to expand the chassis of the system's minicomputer control unit, according to the firm. This expansion contains the vector processor, character generator and necessary electronic interfaces for optional equipment at the console.

An operator console is also available for the Beta COM 700L system to accommodate additional tape drives, disk drives and the I/O terminal.

In addition to providing the communications between the system and its operator, each system uses a standard Teletype ASR 33 to input parameters for program processing through the keyboard or punched paper tape.

In conjunction with the optional disk file, all systems, programs, job parameters and special routines can be called automatically from disk.

Gould is at 20 Ossipee Road, 02164.

Circuit Board Allows OCR Device To Handle Multiple-Font Reading

ROCKVILLE, Md. – Users of the RIT 2000 OCR turnaround document reader from Input Business Machines, Inc. can now adapt their device to read up to six numeric fonts by inserting or removing a single circuit board, the firm said.

Boards which can be inserted to allow the machine to read alphanumeric or handprinted data are also available the firm noted.

The RIT 2000 is a hand-fed device, with autofeed and output stackers optional.

The system costs $5,000, with individual boards for OCR fonts costing $800 each, from the firm at 11900 Parklawn Drive, 20852.

Correction

Benchmarks made at Bombardier, Inc. ["Souped-Up 50 Right on Target as 370 Replacement," CW, Dec. 25-Jan. 1] showed that a 360/50 was about 10% slower in throughput than a 370/135.

A Look at Tape Drives—Part 2

IBM's 6,250 Bit/In. Users Pleased

By Patrick Ward
Of the CW Staff

NEWTONVILLE, Mass. – Users of the 6,250 bit/in. Model 6 version of IBM's 3420 tape drive are finding they require from 20% to 60% fewer tape reels.

More importantly, however users interviewed recently stressed they were experiencing less read/write I/O errors with their Model 6s than on their previous Model 5s or 7s.

"The big, intangible savings [with the Model 6s] is the lack of I/O errors so that you don't have to make reruns of programs. That has got to mean a tremendous savings," said Thomas P. Ogden, manager of DP operations for Group Hospitalization, Inc. (GHI) in Washington, D.C.

Ogden said his own shop's I/O problems have decreased 75% since the switch to Model 6s. He attributed the change to the self-cleaning of tapes.

Ogden uses the 6,250 bit/in. tape drives for statistical files, day-to-day transaction-type files and for containing a master file.

Reasons for Changing

The impetus behind the move from 3420 Model 7s to 3420 Model 6s was a desire to reduce the number of tape drives the shop needed and to boost throughput on I/O-bound jobs, Ogden explained.

So far, GHI has gotten what it wanted. It has cut down from 22 Model 7s to 20 Model 6s and might go to 18 soon, he said, adding that throughput is also up.

The tape drives serve two 1.5M-byte 370/158s. The shop has both 3330 Model 1 and 11 disk drives, with a total capacity equivalent to about 60 Model 1 spindles, Ogden explained.

Switching from the Model 7s to the Model 6s did not require programming changes, he said. However, "if you want to go to 1,600 bit/sec [with the 6s] you have to go in and make the JCL change, whereas before it defaulted to 1,600 because that was our primary bit/in. form."

Though Ogden mentioned he had shakedown problems with the tape drives' control unit – "it was just writing garbage data at the end of files" – he said he had experienced less downtime on the Model 6s than on the 7s.

Longer Reordering Intervals

Ogden said he thinks the main difference with the Model 6s is the way they manage to maintain tapes in better condition. GHI had formerly reordered 500 to 600 tapes every nine months, but can now stretch the interval to 15 months.

While Ogden could not give the exact reduction in the number of tape reels GHI needed after switching to the higher density drives, he pointed out that the shop was about to expand from a 10,000 to a 12,000 tape reel library when the 6,250 bit/in. drives came in. The utilization of the denser formatted tapes have since made library expansion unnecessary.

60% Fewer Tape Reels

The daily processing cycle at State Auto Mutual Insurance Co. in Bloomington, Ill. requires 60% fewer tape reels since IBM field-upgraded the shop's 16 Model 5s to Model 6s, according to William N. Eschleman, assistant vice-president.

The 6,250 bit/in. drives had an attractive cost/throughput ratio, Eschleman said. After the upgrading, throughput gains averaged 20%, and one major processing run now takes only half as long as it formerly took, he mentioned.

State Auto uses the drives for batch processing its master files at night and then loads an eight-spindle 3330 disk system in the mornings for daytime master file inquiries and updates.

The shop's mainframe is an IBM 370/145 under DOS/VS, and the only reprogramming done for the higher density drives was to take advantage of their capability for a bigger blocking factor under VS, Eschleman noted.

Eschleman's shop, like Ogden's, often sends tapes to other DP shops that can't work with the 6,250 bit/in. formats.

State Auto solved the problem by keeping two of its Model 6s switched to 1,600 bit/in.; GHI retained 1,600- and 800 bit/in. Model 5 drives for this purpose.

Eschleman, like Ogden, is impressed with the Model 6's read/write reliability, which he said is better than the 1,600 bit/in. drives' reliability.

"I think we've had one data check using 7- or 8-year-old tape" in seven months, he recalled.

He also praised the drives for being simple to load, since there is no locking mechanism, and for being self-cleaning.

Three Things Considered

Another user, also in the insurance industry, said his company considered three factors before replacing 16 Model 5 drives with Model 6s.

The first factor was whether there would be a huge conversion effort; the second was whether the drives could cut the size of the shop's tape reel library, and the third was whether the drives would bring a throughput gain.

No reprogramming was needed and throughput did climb, but the biggest change was in the size of the user's tape library. It shrunk from 10,000 to between 6,000 and 7,000 reels.

...STC Users Happy, Too

NEWTONVILLE, Mass. – Users of Storage Technology Corp.'s (STC) 6,250 bit/in. tape drives have reported their newly installed equipment has helped them boost system throughput.

Nationwide Insurance Co. has replaced 42 STC 1,600 bit/in. drives with 35 of the 6,250 bit/in. machines, even though the company has added a third large mainframe to its shop because of growing business.

The insurance company has put all its master files on the 6,250 bit/in. drives, and one master file reel can now hold what three and one half 1,600 bit/in. reels held, according to Paul Cherry, director of DP planning.

Cherry said he expects the 6,250 bit/in. tapes will also bring a reduction in I/O error rates, but he said it is too soon to tell.

Another user of STC's 6,250 bit/in. drives, a midwest utility with about 100 disks, half of them IBM 3330 Model 11s uses its 6,250 bit/in. tapes for on-line dumps, restores, log tapes and transactions logs, plus normal heavy batch work.

The drives halved the amount of operator intervention in the dumping of a Model 11 disk from six disk mounts to three. Transfer time has also been reduced, according to the shop's operations manager.

Large data transfer from the Model 11 disks to 1,600 bit/in. tape would result in a bottleneck, he said.

The utility's transition from 1,600- to 6,250 bit/in. STC drives was transparent to applications programs, he said. The Sysgen was modified so that all of the 1,600 bit/in. input tapes default to 6,250 bit/in. on output.

So far, the shop has been able to cut 3,000 tapes from its 29,000 reel library. However, since the library retains many tapes for six months or a year, the full effect of the changeover may not show until then.

Meanwhile, the operations manager said that the 6,250 bit/in. drives seem to be producing less I/O errors than the 1,600 bit/in. equipment it replaced. Perhaps because the drive is built to higher tolerances, its error recovery is significantly better, he said.

One possible disadvantage of 6,250 bit/in. reels, the user said, is that transmitting all their contents over a data link takes a long time, thus extending the length of time in which something can go wrong. He said his shop is thinking of multivolume transmission of files instead.

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TV Screens Used for Plotting

CUPERTINO, Calif. – The Model 4416 Graphic Video Generator I/O card from Intermedia Systems allows Hewlett-Packard 2000 minicomputer users to do plotting on standard television monitors, according to the vendor.

The single card graphics system generates a composite video system which displays a 256 by 256 point matrix on any TV screen with a RS-232 interface, a spokesman said.

Two or more of the boards can be set to generate color and/or grey scale displays through an internal synchronizing feature on the boards.

Refresh memory for the screen is provided by the board's 16 4K random-access memories (RAM), which permit a plotting rate of over 200,000 point/sec. Each point in the memory may be individually set or cleared, the firm said.

Programmable functions include set points, clear points, clear screen and reverse video polarity.

The 4416 costs $2,750 from Intermedia Systems at 20430 Town Center Lane, 95014.

Controller Prices Reduced

OAKLAND, Calif. – Ball Computer Products, Inc., known previously as Decision, Inc., has announced a 10% to 12% across-the-board price reduction on minicomputer controllers effective Jan. 1.

Ball Computer is at 5601 College Ave., 94618.

Wang's 'Desktop' System 2200C Speeds Tape and Disk Loading

TEWKSBURY, Mass. – The System 2200C from Wang Laboratories, Inc. is an enhanced version of the firm's System 2200B "desktop computer" but offers faster tape and disk loading speeds, an improved "program protect" and a larger number of Basic language statements, the vendor said.

Faster program overlays double tape loading speed and make disk loading six times faster, Wang said.

The 2200C's ON ERROR GOTO statement can prompt the operator in recovering from errors; COM CLEAR improves use of memory space, and RETURN CLEAR boosts subroutine efficiency, Wang stated.

The character edit keyboard, an option on the 2200B, is standard on the 2200C.

The 2200C costs $5,800 with lease plans available. System 2200A and 2200B CPUs in the field can be upgraded to a 2200C for a retrofit charge from Wang at 836 North St., 01876.

Tape Transceiver Customizes Terminal

PHOENIX – The user of a programmable tape cartridge transceiver from Three Phoenix Co. can attach the device to any terminal with an RS-232 interface to create an intelligent data entry or data transmission system, according to the vendor.

The transceiver utilizes 3M's DC300A tape cartridge and Intel's 8008 microprocessor and 1702A programmable read-only memories (Prom).

The customer must have the capability to program the Intel memory or, alternately, Three Phoenix or most Intel distributors can do the programming.

The transceiver has hardwired full-duplex modes, switchable transmission speeds of 110- to 2,400 bit/sec, local or on-line operation and a switch to provide even, odd or no parity.

The device costs $2,695 from the firm at 10632 N. 21st Ave., 85029.

Series 9500 Disk Stores 270M Bytes

SUNNYVALE, Calif. – The Series 9500 disk storage system from System Industries can provide up to 270M bytes (16-bit words) of storage at an average access time of 30 msec, the vendor said.

The company has interfaces for the Data General Nova, the Digital Equipment Corp. PDP-11 and Varian and Interdata machines, a spokeswoman said. Interfaces for the DEC PDP-8 and Microdata and Computer Automation minis are being developed, she added.

The Series 9500 systems combine Control Data Corp. (CDC) Storage Module Drives (Models 9760 or 9762) with a controller which handles address verification, error checking and sector/track incrementing in hardware, the firm noted.

The System Industries controller links up to four of the CDC drives to a computer, providing 270M byte storage when the larger-capacity 9762 drives are used.

The controller hardware can also, with a single instruction sequence, execute the "seek" function, transfer multiple blocks of data and verify the accuracy of the operation when complete, the firm said.

Matches CPUs, Drives

The controller also matches the performance of slow CPUs with the fast transfer rates of the CDC drives.

The Storage Module Drives can transfer data at 1.2M byte/sec and use removable disk packs in their record/read operations. Each disk pack contains five disks, with six surfaces used for recording.

Cost of the 9500 ranges between $15,000 and $30,000 in single quantities, with deliveries beginning in the first quarter of the year from the firm at 535 Del Rey Ave., 94086.

Interface, Power Supply Available for 4553 Printer

SECAUCUS, N.J. – An RS-232 serial interface and power supply has been introduced by Facit-Addo for its Model 4553 serial page printer.

The 4553 is a 15 char./sec, 80-column, impact page printer with a 5 by 7 dot matrix. The printer uses a single hammer and has only three moving parts, a spokesman said.

The printer, with interface and power supply already assembled costs $1,545 from the firm at 501 Winsor Drive, 07094.

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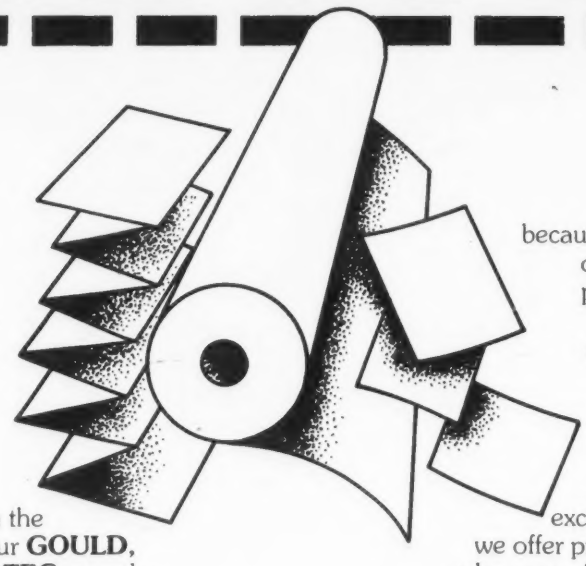

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Distributed Minis — Part I

University Labs Get Right Power Level at Right Time

By Vic Farmer
Of the CW Staff

ROLLA, Mo. — One answer to a growing demand for computer services is to set up a minicomputer network that can distribute low levels of computer power to end users through remotely located minis, but also allows the users to tie into a larger mainframe to provide bursts of real computing power when needed.

The University of Missouri (UMR) here is developing such a network, in which nine remote minicomputers and an IBM 360/50 will be eventually connected to serve six remote laboratories.

James H. Tracey, professor of electrical engineering at this campus, explained the motivation for developing the mini network was based on a number of needs. These needs included the university's desire to bring the power of the larger 360/50 system into the laboratories, provide improved input media to the 360/50, replace older and inconvenient data handling techniques and provide on-line support for high-speed interactive graphic terminals, as well as to allow other applications.

Typical Constraints

But there were the typical constraints of time, money and manpower on the development of the new network. "In order to keep the costs low, outside consultants were out of the question, and all work had to be accomplished entirely with in-house resources," Tracey said.

The university decided to interface a single front-end mini to the 360 I/O channel, rather than use dedicated hardwired controllers for high-speed data links, paper tape reader and mark sense card reader. The single selector channel was heavily loaded so the front end was interfaced to the multiplexer channel, Tracey added.

"The front-end processor also had to be capable of operating in byte multiplex mode because there were a number of unbuffered I/O devices on this channel which could not be locked out by burst transfers for any appreciable length of time," he said.

The system engineering team decided to use a general-purpose mini instead of a machine with a specialized instruction set for communications software because the university intended to acquire additional mini-based systems to serve a variety of functions.

"The confusion of having to work with more than one instruction set, different operating procedures and different utility software would be avoided by specifying that all four minis be compatible," Tracey explained.

A network of like minicomputers has been a distinct advantage at UMR. Not only are disk cartridges easily exchanged in a number of applications, but the easy exchange of computer hardware, peripherals and software has been a tremendous advantage, which has also significantly reduced maintenance costs, Tracey said. And, in addition, both hardware and software maintenance can be handled by one full-time person.

When the minicomputers are not operational in the network configuration, they are available as stand-alone units.

Another advantage cited by Tracey is that a block of like machines can be scheduled at regular laboratory meeting times. A student may receive instructions on a minicomputer located in the computer center, but if he needs extra time he can use a mini system in a different department, Tracey added.

Most applications supported by the network are in data acquisition, preliminary data analysis and graphics analysis.

At the remote mini, data can be input and buffered from a variety of sources, including a keyboard, paper tape, A/D converter, graphic tablet, graphics terminal or direct digital input from an experimental device, Tracey said.

In some applications, preliminary analysis can be performed at the remote mini to verify the correctness or presence of the data; the data, if necessary, can then be transmitted to the 360/50. Output at the remote mini may appear on a CRT, printer or paper tape or as the output of a digital-to-analog converter.

Interaction with the main computer provides options in the use of peripheral devices not available at the remote sites, including a California Computer Products plotter, larger disk storage, card punch equipment and a high-speed line printer.

Part II will cover some of the technical aspects in the design of the network.

Miniworld

AVC Office System Has 76M Bytes, CRT, Line Printer

SUNNYVALE, Calif. — The General-Purpose Office Computer System from American Videonetics Corp. (AVC) costs a bit more than basic accounting systems but it has the capacity of much larger computer systems, the firm said.

The AVC system consists of a CRT, line printer, 8K to 64K minicomputer and two AVC Datacord tape memory systems.

Bigger Than Floppies

These cartridge tape systems provide 76M-byte storage capacity, which is four to 20 times the memory capacity of other data storage media such as Philips cassettes or floppy disks, the firm stated.

The worst-case time to search 76M-bytes is 48 seconds, a spokesman noted.

The company intends to supply software packages for accounting operations, business functions and word-processing applications.

The AVC system costs $27,000 from the firm at 795 Kifer Road, 94086.

This teller's in love with Bunker Ramo's new on-line system because it gives her positive identification, account balance, hold conditions, and printed verification on every transaction in just a few seconds.

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- Entries then stored in solid-state memory in digital form.
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- Unit records automatically and sequentially numbered.
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Coastal Network Warns Danes Of Dangerous North Sea Floods

COPENHAGEN, Denmark – A computer system is working around the clock to monitor the hard-to-predict North Sea waters along a 62-mile stretch of southern Denmark's coast which historically has been threatened by floods.

With this computer-based flood warning system, installed in 1972, the Danish government hopes to save lives and minimize property damage in the below-sea-level areas of southwestern Jutland.

These lowlands are the northern part of a geographic area along the North Sea coast that reaches from Belgium through the Netherlands and Germany to Denmark and has to be protected by dikes.

There are five electronic monitoring stations located along the coast between the German border and the Danish city of Esbjerg. Each station gathers data on the changing water levels of the sea. This data is sent via telephone communications lines to the main computing system at Toender.

A sixth monitor, installed at a lighthouse about nine miles out at sea, communicates its data via radio.

The computing system, based on an 8K Hewlett-Packard 2114 minicomputer, scans each data-gathering substation once every half hour. Incoming data on actual water levels is entered into the computer along with meteorological information such as barometric pressure and wind speed and direction.

Regression Model

"A complicated statistical regression model is able to synthesize electronically all factors determining the ocean's water level and produce an accurate three-hour forecast," H.B. Soerensen, head of the government coast authority responsible for the operation, explained.

"The minicomputer's mathematical model, which takes into account the time of year and the influence of the position of sun and moon on tidal action, was developed over a three-year period by the Technical University of Denmark," he added.

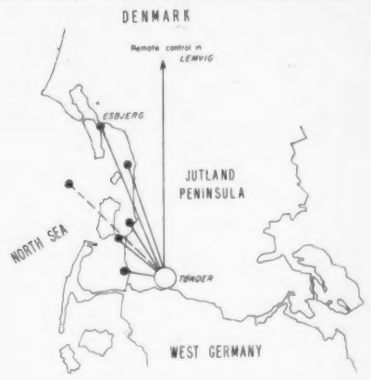
The mathematical model is based on 10 years of data that was collected by standard measuring equipment and recorded manually. Today, that data base is continually updated with the data from the system's six monitoring substations to improve the model.

"Now, the computer compares all incoming data with values and limits derived from that data base. Should a three-hour forecast go beyond tolerable sea-level limits, responsible personnel are signaled automatically," Soerensen said.

The manager of the system is then able to take control, querying any substation for additional updated information and asking the computer to display a graph of water level performance over the past 18 hours.

"If a real danger of dike overflow exists," Soerensen said, "the three-hour warning is sufficient to prevent loss of life.

"Luckily, there has been no occasion to issue such a warning, but there were two close calls in the late 1973 storm season. Each time the system performed flawlessly, demanding attention only when waters rose to dangerous levels."



Flood Warning System

'Hitchhiking' System For Boston Students Links Drivers, Riders

CAMBRIDGE, Mass. – Because hitchhiking, one of the more popular modes of travel for impoverished college students, is becoming increasingly dangerous, two Harvard University students have come up with an alternative: Computer-Hitch, a nonprofit corporation which matches up students wanting to travel somewhere with drivers who are going there.

The students, Robert Ullman and Robert Lessin, evolved the idea two years ago because, as Lessin put it, "we travel a lot, mostly by hitching, and we've both had some pretty bad experiences."

Computer-Hitch uses two computers at Harvard, a Digital Equipment Corp. PDP-11 and an IBM 370/195, to match up drivers and riders. The firm hopes to purchase its own mini next year.

Lessin, who worked summers as a programmer, wrote the program from scratch in both Fortran and PL/I.

Students from over 25 colleges in the Boston area have joined the program. Since "safety is the main concern," Lessin said, a participant must provide identification before being assigned a code number which is used whenever he calls in to find a ride or riders.

Lessin said the code number prevents nonmembers from using the service. Even if a nonmember could obtain the service's phone number, which is handed out only to members, it would be impossible for that person to be at the member's phone when the answering service called back with a ride arrangement, he explained.

Membership in Computer-Hitch costs $1 for each rider, who must also pay a fee of 50 cents when he asks to be matched up with a driver.

Each weekend between 50 and 200 students use the service. Lessin said plans are being made to expand Computer-Hitch to New York City next year, and he eventually hopes to see it go national.

Films for Deaf Teach Signs for DP Terms

NORTHRIDGE, Calif. – To facilitate the training of deaf students in the computer field, California State University at Northridge (CSUN) has produced four films showing the sign language for computing and DP terms.

Each film contains 30 terms arranged in the order of frequency of use in a beginning computing course. The films are in color, run approximately six minutes each and have no sound track.

Each term is presented to the viewer three times. First, the term is spelled out. Then the sign for the term is shown, seen from the front as the recipient would see it. At the same time, the term also appears on the screen in English letters.

At the term's third appearance, the sign is made again, seen from the rear as the user would view it.

The films were made under a grant from IBM with the cooperation of CSUN's Center on Deafness. They will not be distributed by the university, but interested groups may request to purchase prints directly from the laboratory.

The Center on Deafness is at 18111 Nordhoff St.

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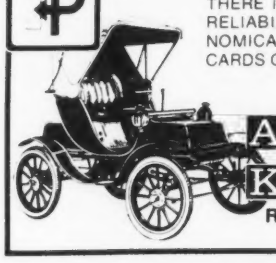

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Calendar

Jan. 22, Newark, N.J. – **Microprocessors and Microcomputers,** a symposium sponsored by Newark College of Engineering/New Jersey Institute of Technology. Contact: Continuing Education, NCE/NJIT, 323 High St., 07012.

Jan. 25-27, Bowling Green, Ohio – **Second Annual Conference on Computer Graphics and Interactive Techniques,** sponsored by the Association for Computing Machinery's Special Interest Group in Computer Graphics. Contact: David L. Fulton, Department of Computer Science, Bowling Green State University, 43403.

Jan. 26-28, Andover, Mass. – **Future Outlook for Ultramicrofiche Systems,** sponsored by the Institute for Graphic Communication, Inc. (IGC). Contact: Richard D. Murray, IGC, 375 Commonwealth Ave., Boston 02115.

Jan. 27-29, New Orleans – **OCR Users Association (OCRUA) Winter Conference.** Contact: T. David McFarland, OCRUA, 505 Busse Highway, Park Ridge, Ill. 60068.

Jan. 28-30, Andover, Mass. – **Micrographics: Winds of Change,** sponsored by the IGC. Contact: Richard D. Murray, IGC, 375 Commonwealth Ave., Boston 02115.

Call for Papers

SIXTH ANNUAL PITTSBURGH CONFERENCE ON MODELING AND SIMULATION, April 24-25, Pittsburgh, Pa.

Papers are requested on social, economic, educational, urban and global modeling and simulation as well as all traditional areas. They should describe significant contributions which add to the knowledge in a particular area or which describe the origin and progress of research that is currently being conducted.

Two copies of titles, authors, addresses, abstracts and summaries must be submitted by Jan. 31 to William G. Vogt or Marlin H. Mickle, Modeling and Simulation Conference, 231 Benedum Engineering Hall, University of Pittsburgh, Pittsburgh, Pa. 15261.

14th ANNUAL TECHNICAL SYMPOSIUM, June 19, Gaithersburg, Md.

First and second prizes of $500 and $250 will be awarded for papers submitted on the symposium's theme, "Computing in the Mid-70s: An Assessment." Papers should emphasize the interactions and interdependence of computer programs, data, equipment, procedures, organizations and people in the successful development and application of information systems.

Of special interest are reports on theoretical work, projects under development or practical techniques in the areas of computing with multiprocessors, structured programming, data security, data management, computer communications and ADP standards.

Five copies of an abstract and a draft of a maximum of 3,000 words must be submitted by Feb. 15 to Eric W. Wolf, Bolt Beranek and Newman, Inc., 1701 N. Fort Myer Drive, Arlington, Va. 22209.

7th INTERNATIONAL FEDERATION OF INFORMATION PROCESSORS (Ifip) CONFERENCE ON OPTIMIZATION TECHNIQUES, Sept. 8-14, Nice, France.

Papers pertaining to the conference aim of presenting recent advances in theory and practical applications in the area of system modeling and optimization are requested.

The conference will be devoted to methodology and applications, and topics solicited for presentation include optimization problems on a global scale, modeling problems in nonindustrial processes, social responsibility in modeling and optimization of graduate education in system science and engineering.

Abstracts must be submitted by April 1 to 7th Ifip Conference, Parc Valrose, 06034 Nice Cedex, France.

FOURTH DATA COMMUNICATIONS SYMPOSIUM, Oct. 7-9, Quebec City.

Papers in all areas of data networks are solicited for the symposium, which is jointly sponsored by the Association of Computing Machinery and the Institute of Electrical and Electronics Engineers.

The theme will be "Network Structures in an Evolving Operational Environment" and topics will include design and analysis, software considerations, interfaces, standards, reliability, security, legal and regulatory aspects and measurement and performance analysis.

Four copies of complete papers and 500 word summaries, including the author's name, address, phone number and affiliation, must be submitted by May 1 to Professor Wesley W. Chu, 3732 Boelter Hall, University of California at Los Angeles, Los Angeles 90024.

On Computer Science

ACM Conference Set for Feb. 18-20

WASHINGTON, D.C. – The Association for Computing Machinery (ACM) will hold its Computer Science Conference at the Statler-Hilton Hotel here on Feb. 18-20.

Scheduled speakers at the conference include David Kuck of the University of Illinois, who will speak on parallel processing of ordinary programs; John R. Rice of Purdue University, who will discuss the algorithm selection problem; Donald Bitzer of the University of Illinois, who will talk on computer-based education; and David Gries of Cornell University, who will present a paper on research in programming and programming languages.

Special events planned for the conference include exhibits by publishers and distributors of computer science books, the presentation of the George Forsythe Memorial Lecturer Award to John R. Rice and a luncheon for computer and information sciences department chairmen.

Registration fees for the conference are $25 for members, $30 for nonmembers and $5 for students. Further information can be obtained from William F. Atchison, Department of Computer Science, University of Maryland, College Park, Md. 20742.

Societies/ User Groups

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CI Notes

Keypunch Builder Gets IBM Restraining Order

NEW YORK – The William Marion Co., rebuilder of IBM punched card equipment, has filed antitrust suits against IBM and obtained a temporary restraining order against IBM.

Marion alleges IBM's requirement that it use IBM parts on its machines in order to qualify for a maintenance agreement constitutes an illegal "tie-in."

The temporary restraining order, issued by a federal district judge until a hearing for an injunction Jan. 16, prevents IBM from requiring the use of its parts in machines covered by maintenance agreements.

The suits, filed in both state and federal courts, seek damages of $50 million and $250 million, respectively.

An IBM spokesman said the firm will reserve comment while it studies the suits.

Marion said it doesn't use IBM parts, but noted its components have been designed to meet IBM specifications.

Since November, when IBM refused to enter into contracts to maintain equipment with non-IBM parts, IBM has been providing service on a "per call basis" at hourly rates, Marion said, which is making it impossible to continue business on a profitable basis.

Marion said it is losing $3,000 to $5,000 a day and "expects to be forced out of business in the very near future."

Justice Amends Complaint

NEW YORK – Judge David N. Edelstein has granted the Justice Department's motion to amend its complaint against IBM.

IBM had opposed the motion, principally on the grounds that the amendments covered actions that happened since the complaint was filed six years ago. IBM lawyers further argued that amending the complaint would delay the trial of the government's suit against IBM because it would necessitate further depositions.

The amendments charge IBM with illegally dominating the market for plug-to-plug compatible peripherals.

The trial is scheduled to begin Feb. 18. Edelstein is still considering a motion by IBM that would force the Commerce Department to disclose data from an industrywide census.

Ford Orders Honeywell 66/20s

MINNEAPOLIS – Honeywell, Inc. received its largest single order for its new computer line from Ford Motor Co., which ordered 19 Model 66/20s valued at $25.6 million.

"Coming from Ford, one of the most sophisticated computer users in the world, it is very gratifying," said Honeywell President E.W. Spencer. Honeywell recently has been busy denying rumors that it intends to depart the DP business.

The systems, which were ordered on a combination of third-party and normal leases, are being installed in 19 Automotive Assembly Division plants, each with a Model 6600 front-end communications processor. System sizes vary from 385K bytes of main memory to 768K, Honeywell said. Installations began in December.

American Used Picks Up DTS Units

BOSTON – American Used Computer Corp. has purchased the entire inventory and lease base of DTS-100A terminals from Badger Meter, Inc.'s Electronic Division. The remote job entry terminals consist of a PDP-8/L mini, a line printer and card reader. American Used will provide maintenance support.

Precursor to FS?

IBM Expects S/32 Sales to Rival S/3

By E. Drake Lundell Jr.
Of the CW Staff

ATLANTA – Taking a leaf from the successful sales book of the System/3, IBM's announcement last week of the System/32 marked even further penetration into the small business machine market.

The System/3, launched in July 1969, buffeted the downturn of 1970-1971 and scored record installations in its first year.

And it appears that IBM expects the System/32 to match the sales success of the initial System/3 in spite of today's declining economy.

During the first year of System/3 shipments, 3,000 units were installed and IBM would be "satisfied" if the deliveries of the System/32 "eclipsed" those of the System/3 during its first year, according to Jack Rogers, president of the IBM General Systems Division which manufactures and markets the new system.

That would mean deliveries of between 6,000 and 8,000 System/32s in the first full year of operations in order to equal the dollar volume generated by the System/3 during its first year.

The announcement is also similar to the System/3 announcement of five years ago, in that the System/32 will now be the major IBM entry-level system for small businesses – taking IBM into businesses smaller than ever before, as did the System/3.

The unit is designed for businesses with annual revenues between $1 million and $10 million and with 10 to 250 employees.

Diskettes Emphasized

Like the System/3, the unit features few dramatic breakthroughs but does signal a change in IBM's philosophy in the data entry area as did the System/3 with the 96-column card.

IBM executives indicated strongly here that they expect the diskette form of storage to rapidly become the primary media for its systems; the card option is not available at all with the new unit.

There were also strong indications that diskette storage would be pushed harder as the storage medium for the System/3 and other small units in the IBM line.

FS Software

The announcement of the System/32 may also be a precursor to later IBM announcements of its rumored Future Systems (FS) – just as the System/3 announcement preceded the 370 announcement by about a year.

The unit clearly embodies many of the features that IBM has planned for its FS Q system software as revealed by the IBM documents made public in the Telex antitrust action. Those documents showed IBM's desire to make a "programmerless system," and Jack Rogers used that exact term in describing the System/32.

While there are provisions for user programming of the new unit, it is IBM's stated intention to penetrate new markets and businesses that are either too small or too unsophisticated to afford programming help.

One of the major competitive thrusts of the new system appears to be against accounting machine makers as much as against other computer companies. The system is expected to replace accounting machines in the market area targeted for the new machine.

The other major market appears to be the distributed data processing networks under development in many firms.

Government Economists Charge IBM Schemed to Keep Monopoly

By a CW Staff Writer

NEW YORK – Government economists recently charged that "IBM's maintenance of monopoly power was neither inevitable nor honestly industrial, but rather the result of policies and actions aptly designed to protect and maintain that power."

In a filing with the Federal District Court here, the economists also charged that IBM's attempts to maintain its monopoly position were "frequently at the expense of the consumer."

Traditional economic analysis, the brief argued, cannot explain "how IBM has been able to maintain its dominance during a period of rapid growth and technological change; and how IBM has been able to maintain consistently high profits, profits which should have attracted numerous competitors into the market."

To understand these factors, further analysis was needed, they said, "to examine IBM's marketplace conduct which, we claim has been consistently, albeit often subtly, geared to maintaining IBM's dominant position and preserving its sources of market power."

It is through IBM's conduct in the market that otherwise neutral or competition-inducing structures have been transformed into barriers to entry and barriers to the growth of competitors," the brief alleged.

IBM's conduct in the marketplace, the economists argued, "has influenced benign structure, and the result has been anticompetitive structure.

"Second, a conceited pattern of conduct by IBM has itself constituted a barrier to entry."

The most important anticompetitive market practices on the part of IBM include: "leasing, bundling, differentiation of software, fighting machines, tying of products, manipulations of purchase-to-lease price ratios and education allowances," the brief continued.

The system of leasing fostered by IBM, the brief said, places all of the risk of technological obsolescence on the manufacturer, which means that the manufacturer has to maintain control over his customer base.

"IBM's interest in having such a high proportion of its systems as leased equipment rather than sold equipment indicates that it has been able to exercise the market control necessary to benefit from a lease-oriented market," the brief said.

A major element that allowed IBM to exercise market control, the brief indicated, is "IBM's practice of providing software substantially differentiated from that of competitors; that is, IBM's actions resulted in software which would generally run only on IBM machines.

"A key practice which permitted this was and is bundling," the brief said.

"The result of IBM's supplying differentiated software 'free' was two-fold and self-reinforcing," the economists said.

"First, the normal levers available to consumers in a market were taken out of the hands of users of IBM software. They had no price to bid with – either for the type of software to be provided or for the quality or efficiency of the software that was provided.

"Second, since the software that was 'given away' by IBM was differentiated, its acceptance and use made future changeover to systems supplied by others more difficult.

"The cycle continued: the more software the user takes 'free,' the more difficult this problem of eventual changeover; the more difficult the changeover, the greater the leeway available to IBM, the supplier of the software, to channel software development in ways beneficial to him.

"Differentiated software has become a barrier to entry of new competition and to the growth of existing competitors, and a means to permit IBM to remain dominant in the market," the group said.

"An additional effect of IBM's differentiated, bundled software is that it has had the tendency to increase the need for hardware (increasing IBM's revenues and profits) by allowing IBM to provide software that is less than optimal in efficiency," it added.

Cambridge Buys MTI From Bank

By Molly Upton
Of the CW Staff

BEDFORD, Mass. – In a fast turnaround of ownership, Cambridge Memories, Inc. has picked up most of the assets of Memory Technology, Inc. (MTI), which were being held by the First National Bank of Boston after MTI was unable to meet its financial obligations.

Buildings, real estate and accounts receivable were excluded from the sale. Other terms were not disclosed.

Cambridge Memory President Joseph Kruy said his firm will probably discontinue the MTI add-on memories for the 370/155 and 165, since Cambridge products already cover these areas.

However, the MTI memory for the 370/145 will likely be kept in production as it uses MOS and offers a lower performance than the Cambridge unit for the 145.

The MTI 145 would come at the low end of the Cambridge product line and possibly could be attached to 370/135s and 125s, Kruy said.

MTI has a mandatory contract from the General Services Administration (GSA) to supply 370/155 memories. Kruy said Cambridge plans to supply its own 155 units, as they are at least as versatile as MTI's and meet the GSA specifications, provided GSA agrees to that plan, he said.

Cambridge is "discussing" continuation of MTI's contract with Control Data Corp. for 370/145 units, Kruy said. Cancellations in that contract were reported to have caused MTI's cash flow crisis.

Cambridge will provide service on those installed systems formerly serviced by MTI; most systems are being maintained by Control Data.

In the OEM area, Cambridge is evaluating the contracts MTI had for read-only memories and semiconductor developments, he added.

During the transition phase, Cambridge plans to hire "a minimum level of people," Kruy said. John Marino, former president of MTI, becomes a consultant to Cambridge.

Kruy said he could not comment on the antitrust suit filed by MTI against IBM, except to say that the suit was not among the assets explicitly acquired.

Noting that several of the MTI products are complementary to Cambridge's product line, Kruy said he thought it was a good acquisition, one which will strengthen Cambridge's product lines and widen the product base.

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Quantor's Outlook Unhampered By U.S. Economic Uncertainty

CW West Coast Bureau

SAN FRANCISCO – Quantor Corp. President Charles Askanas, while realizing the poor outlook for the nation's economy, has high hopes for his company and the market for computer output microfilm (COM).

At a recent press conference, Askanas said there might not be an improvement in the U.S. economy until the fourth quarter of next year. His own company, he said, has frozen its hiring and production, although production is at an all-time high.

The most encouraging thing about COM, he said, is that fiche has been widely accepted by DP personnel. He said 15% of DP users are now using fiche and he predicted that by 1980, 47% will be using it. The domestic COM market is about $100 million now and will grow to $550 million by 1980, Askanas said.

The paper shortage and increased price of paper has worked to the advantage of COM by making DP personnel more aware of the savings available through fiche, he said.

The biggest problem now, he noted, is the uncertainty of the nation's economy. "There is no uncertainty about it being bad. But it is not certain how much it will affect cost-saving businesses."

Quantor hasn't had a slowdown in the number of orders, although some have required that the company do more sales work than they had to do previously.

NCR has about an 18% interest in Quantor and provides domestic service on Quantor-installed units. NCR has a non-exclusive domestic marketing arrangement plus an exclusive international marketing agreement for the Quantor recorder.

New products introduced at the press conference were a vesicular fiche copier, full-size fiche display and enhancements to Quantor's recorder that include a programmable front-end controller. Askanas said the new products give Quantor a complete product line.

He indicated that Quantor might introduce a reader-printer in six to nine months.

Quantor and NCR domestic sales efforts accounted for about 20% of the net new installations in the U.S. last year and about 23% of the net new installations outside the U.S.

Of 300 Quantor installations, 150 were installed in the last 12 months.

Quantor, based in Mountain View, Calif., now has record backlogs for its recorder as well as its displays and consumables, Askanas said.

Net income this quarter was $128,000, a 312% increase over the same quarter a year ago, he added.

'Dishwasher-Safe' Keyboards Save Calls

FREEPORT, Ill. – A trip to the dishwasher with a dirty, clogged keyboard might save a $100 service call, according to Edward C. Leibig, keyboard marketing manager for Micro Switch, a Honeywell division.

The Hall-effect keyboard from Micro Switch can be unplugged from its terminal, sloshed in detergent and rinsed and stacked to dry, said Leibig. The process is known by the pseudo-scientific term of "dunking," he said.

Most common clogging culprits are pastry crumbs, spilled soft drinks, coffee, hair, lint and paper dust.

The dishwasher water should be kept below 135°F, which is the approximate temperature of most home dishwashers.

Downtime for the most commonly applied washing technique is about one minute per station, Leibig said. Typically, the preventive maintenance crew enters an office, unplugs a given number of "dirty" keyboards, plugs in new boards and then hauls the "dunkers" off to a cleaning room.

The next day the washed keyboards become the "new" boards and the cycle goes on. Subsequent service calls are nearly nil, Leibig said.

Actually, Micro Switch puts all of its keyboards through a washing machine before shipment from the factory here. The keyboards are given a six-minute, high-pressure wash-and-rinse cycle to remove excess flux from the printed circuit boards. The washing machine saves thousands of man-hours annually, one of the many factors that has permitted the Honeywell division to halve its keyboard prices during the past six years.

"This is one case," said Leibig, "where even Emily Post would have agreed that dunking is the correct thing to do. It's dollars to doughnuts."

INFORUMATION

All about the Computer Users' Forum and Exposition in our January 29th Caravan Preview.

This special issue of *Computerworld* will take an in-depth look at the Computer Caravan Forums and Workshops. These unique, user-only forums provide professionals in the computer community with a meeting ground for dialogue with their peers, where experiences are exchanged and solutions to common problems are shared. In *Computerworld*'s Caravan Preview issue, you'll read about these important Forum topics:

- **Computer Systems Management**
- **Software**
- **Trends & Options in Data Communications**

The Caravan Preview issue will also cover the Exposition in detail, with a run-down on Caravan Exhibitors and their products. At the Caravan Exhibition, you'll see virtually every component of a complete computer system displayed under one roof.

Get all the information on the Forum and Exposition that brings you the best of both worlds -- information from manufacturers *and* users -- in the Jan. 29 issue of *Computerworld*. For more details, just contact your nearest *Computerworld* representative. Or, call Sara Steets at (617) 965-5800.

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DG Continues Trend Away From OEMs

SOUTHBORO, Mass. – Like many other system manufacturers, Data General Corp. (DG) has been decreasing its dependence on OEM suppliers by making a growing number of peripherals and offering them with its minicomputers.

The firm stated producing its own fixed-head Novadiscs in 1972 and then expanded into the manufacture of cassettes and paper tape units.

Since then, DG has added its own tape drives and a long-awaited CRT, which was announced in 1972 but put on the back burner until shipments began in 1974.

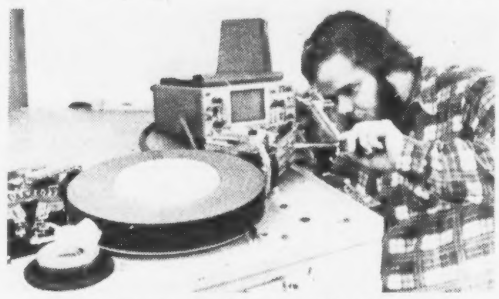
Making peripherals in-house has enabled the company to maintain two sources of supply – in-house and OEM, noted Jitsen Saxena, senior marketing specialist.

In addition, peripherals are accounting for an increasing proportion of the value of a system – as much as 60% or 70%, he said. Being able to supply the peripherals as well as the CPU assures the firm of a larger piece of the system's price tag.

One of the reasons DG decided to make a tape drive, Saxena said, was that it felt it had a better design. The unit operates at 75 in./sec in either 7- or 9-track format.

DG used to get its tape drives from Wang. CRTs with Data General systems were previously supplied by Incoterm.

DG does not make moving-head disks, which are supplied by Diablo, or line printers, which come from Data Products, Saxena noted.

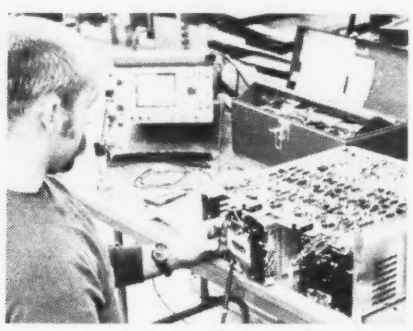


Dave Connor checks out a 6003 Novadisc.

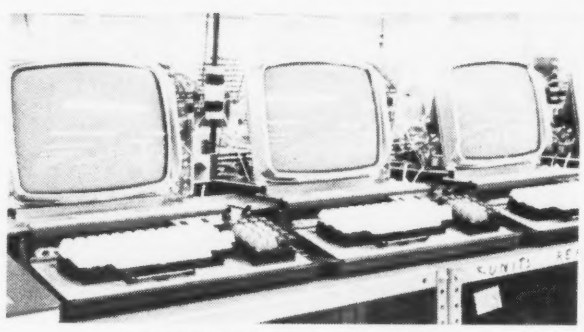
Bob Bosozzi assembles a 6013 paper tape reader.

CW Photos by M Upton

Dilvo Di Placido tests tape drive.



John Wescott adjusts a cassette drive.



Model 6012 CRTs await cabinets.

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For further information or to make appointments to inspect properties, contact:

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Orders & Installations

Arizona Electric Power Cooperative has ordered a computer-based supervisory control and data acquisition system from Control Data Corp. (CDC). The system, based on two CDC System 17 CPUs, will control and monitor power distribution in southeastern Arizona.

The Cytex-5 text editing system by Base, Inc. has been ordered by the Alyeska Pipe Line Service Co. The system uses Datapoint 2200 Version 11s and 1100 terminals as stand-alone devices.

The Kalamazoo (Mich.) Public Schools District has installed a Hewlett-Packard 3000 minicomputer for instructional and research computation previously done by service bureaus.

Midland National Bank of Milwaukee has begun installing 100 NCR 270 financial teller terminals and associated communications equipment valued at $1.2 million.

Ellis/Naeyaert Associates, Inc., an architectural, engineering and planning firm, has installed a Burroughs B 1714.

Alabama Power Co. has ordered a Leeds & Northrup LN5400 computer system to monitor environmental and weather conditions at five of its generating stations.

Systonetics, Inc. has installed the E-Z-Pert Project Graphics System at Exxon Co. in Houston, where it will be used for producing network diagrams and barcharts.

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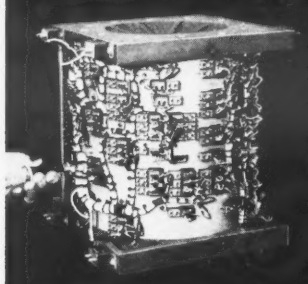

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STRUCTURED DESIGN – a 3-day course presented by Larry Constantine, author of the definitive paper on structured design in the spring 1974 issue of the *IBM Systems Journal*. The seminar concentrates on the design and structure of modules within a system, formalizing and quantifying the philosophy of "modular design." Related to both program design and system design, the course studies the relationship among elements in a module to assure grouping by *functions*. Structured design introduces terms such as *binding, coupling* and *cohesiveness* in an effort to evaluate the goodness of a design. FEE: $395.

New York City Feb. 19-21
Washington, D.C. March 24-26

STRUCTURED PROGRAMMING – a 2-day survey of the philosophy, ideas, techniques and results of structured programming and top-down design. The general approach of structured programming has been widely described in the current EDP literature; however, the rules behind the approach, the resulting savings and benefits, and some of the pitfalls have not yet been fully discussed. This course will not only tell you *what* and *how*, but *why* and *if* structured programming and top-down design are really 'the most significant invention since the stored program concept.' FEE: $275.

Raleigh, N.C. Jan. 23-24
New York City Jan. 23-24
Columbus, Ohio Jan. 30-31
San Diego Feb. 10-11
Seattle Feb. 13-14
St. Louis Mar. 3-4
Tulsa Mar. 20-21

OPERATIONS MANAGEMENT – *Datamation* contributing editor Phil Dorn's 3-day seminar defining the various approaches, techniques and methodologies for operating today's complex data centers. Too few people realize that the data center is *the* computing factory. This course discusses the problem areas – both technical and political – and offers a means for organizing and enforcing an efficient approach to running data centers. Anyone responsible for operations should welcome the opportunity to find out how other people have approached similar problems in operations management. FEE: $395.

Washington, D.C. Feb. 26-28

STRUCTURED TESTING – a 2-day course which will teach the participants how to establish formal, rigorous testing and debugging methods in order to facilitate the maintenance problem. Emphasis will be placed on how to avoid errors – new design techniques, structured walkthroughs, etc. – and how to find bugs – top-down testing, experimental testing techniques. If testing occupies 35% to 50% of the time on a typical programming project, a more defined approach to testing and debugging is surely justified by the cost savings alone. FEE: $275. New York City Jan. 30-31
San Francisco Mar. 24-25

STRUCTURED PROGRAMMING WORKSHOP – this 5-day seminar will not only describe the philosophy, techniques and methodologies behind structured programming and top-down design, but will encourage the participants to acquire a *practical* knowledge of the techniques. Using a major class problem, students will be supervised in a series of workshop sessions during which the principles described in the lectures will be rigorously enforced. This permits the participants to gain "hands-on" experience with the much heralded techniques of structured programming and top-down design. FEE: $595.

Washington, D.C. Feb. 3-7

For a detailed brochure on these and other courses, for inplant presentations, or to be placed on our mailing list, contact Ms. Rikki Moss or Ms. Toni Nash, YOURDON, inc., 575 Madison AVenue, New York, N.Y. 10022 • (212) 486-1757

Communications, Privacy Topics On Expanded Intercon Agenda

NEW YORK – The annual IEEE Intercon, compressed into a three-day show, offers several new features to exhibitors and attendees alike.

Scheduled for April 8-10 at the New York Coliseum and Hotel Americana, the 37 sessions will focus on topics ranging from communications to privacy to microcomputers.

In addition, 13 sessions are being presented by IEEE groups and societies.

Reservations have been received for over 70% of the exhibit space covering two of the Coliseum floors, according to Intercon organizers.

The number of contract exhibitors is up substantially and the number of display spaces contracted is up slightly over the same time last year.

Intercon/75 has been planned to present about 380 booths, an increase of 10% over 1974.

Evening exhibit hours have also been added. The exhibit floor will be open Tuesday and Thursday from 9:30 a.m. to 6 p.m. and until 9 p.m. on Wednesday.

An innovative "One-on-One Technical Forum" will be held in the Coliseum, where selected session speakers will be available to answer attendees' questions.

Areas designated as Applications Forums will enable exhibitors to make detailed presentations of products to prospective users.

Sen. Barry Goldwater (R-Ariz.) will be the keynote speaker Tuesday at 9 a.m.

Session Topics

Several sessions will focus on the impact of the microcomputer including: the microcomputer revolution, microprocessors: an alternative to random logic design and microprocessors in instrumentation.

Sessions in the communications area will include: future communications technologies: 1984-2001, controversial topics in digital communications, computer communications techniques and computer nets – implications for computers and communications.

Others will focus on satellite communications systems and advances in telecommunications measurement techniques.

Other topics will be the applications of technology in medicine, automatic test equipment, automotive electronics, transportation and oceanography.

Still other seminars will discuss whether robotics will answer industry's needs and computer technology during hard times.

The session on the impact of new technology on multilevel memory and storage systems will feature a look at cache memories for minicomputers, multics three-level bridging system, the IBM 3850 mass storage system, random file processing in a storage hierarchy and memory management.

Among the topics to be examined during IEEE group/society sessions are: data privacy and security, computer technology: some alternative futures, the engineer in transition to management and computer systems for medical applications.

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Contracts

Interdata has won a contract for delivery of Model 7/16 minicomputers to Spectrotherm Corp. to be used in Spectrotherm's Model ST-10 infrared instrument.

Computer Corp. of America has been awarded a contract by the U.S. Department of State for two copies of the Model 204 data base management software system.

The Autonetics Group of Rockwell International Corp. has been awarded a $4.7 million contract to produce automatic fingerprint readers for the Federal Bureau of Investigation (FBI). The readers will eventually be integrated into an automated fingerprint identification system.

Strider Systems, Inc. has been awarded a consulting contract by the City of Austin, Texas, to develop and implement a telecommunications-based utility billing and customer information system.

Maryland National Optimation Services, Inc. has been awarded a contract valued at $225,000 by the U.S. Immigration and Naturalization Service to convert information on aliens to magnetic tape.

Texas Instruments, Inc. has received a contract from Ford Motor Co. for 500 Silent 700 Programmable Data Terminals and Electronic Data Terminals for use in Ford dealerships' parts management and inventory control systems.

Executive Corner

■ Bruce K. Anderson has been named vice-president of corporate development at Automatic Data Processing, Inc.

■ M.R. Clement Jr. has been appointed vice-president of marketing and international operations at Incoterm Corp.

■ Robert E. Ward has been appointed vice-president of operations for the Business Machines Division of The Singer Co.

■ Frederick Kells-Murphy has been named executive vice-president, and Henry B. Robbins has been promoted to vice-president of operations at Applied Data Processing, Inc.

■ Frank A. Kirby has resigned from his position of vice-president of marketing, Optical Scanning Corp.

■ Roger W. Johnson has been appointed vice-president and general manager of the Equipment Products Group of Memorex Corp.

■ David B. Levi has been promoted to vice-president and assistant general manager of Raytheon Data Systems.

■ Data General Corp. has named Henry Burkhardt III vice-president of manufacturing; John J. Dias, vice-president and treasurer and William F. Palmer, controller.

■ George Morris Jr. has joined Spectra Data, Inc. as vice-president of engineering.

■ National CSS, Inc. has promoted David Fehr to vice-president, marketing/information systems, and Michael S. Field to vice-president, data systems.

■ Control Data Corp. has promoted John Sciamanda to vice-president and corporate contracts counsel, Jack R. von Gillern to executive vice-president of services and Donald L. Bickel to vice-president and executive assistant in services.

■ C.J. Brown and D.E. Vacheron have been appointed vice-presidents of the Service Bureau Co.

■ Brian D. Wiltshire has been appointed divisional vice-president, corporate development and planning, at On-Line Systems, Inc.

■ Russell S. Dunkle has been elected vice-president and general manager of the Contracts/Consulting Division and Richard F. Walsh has been elected vice-president at PHD Systems for Computing, Inc.

■ Richard A. Patterson has been elected vice-president of finance of Automatic Data Processing, Inc.

■ John C. Storck Jr. has been appointed executive vice-president of the Software Division of Computer Systems Education Corp.

■ John H. Clark has been named president of the Computer Products Division of Itel Corp.'s Data Products Group.

■ Dennis J. Daniels has been appointed vice-president of marketing at Zentec Corp.

■ Dan Elliston has been promoted to president of the Lease Marketing Division of Itel Corp.'s Data Products Group.

■ Robert H.F. Lloyd has resigned as senior vice-president/technical director and member of the board of directors at Advanced Memory Systems, Inc.

■ D. Lane Everett has joined University Computing Co. as corporate vice-president.

■ Leif Andreasen has been promoted to vice-president of engineering at Anderson Jacobson, Inc.

■ Emmett W. Johnson has been promoted to vice-president of operations for the Sperry Univac Defense System Division.

■ Christopher J. Lynch and Richard R. Douglas have become vice-presidents of business and marketing planning for North American operations and of data processing operations, respectively, for Honeywell.

■ Dr. Arthur J. Collmeyer has joined Calma Co. as vice-president, software development.

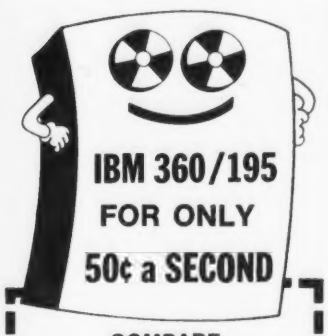
■ William A. Boss has been named assistant vice-president and manager of customer service for Pansophic Systems, Inc.

■ GTE Data Service, Inc. has elected Daniel H. Center vice-president, field operations and Thomas E. Keesling, vice-president, systems development.

■ Readactron Corp. has named Robert L. Fahrenthold vice-president, manufacturing, and Donald F. Novak, vice-president, U.S. sales.

■ Data Disc, Inc. has elected Esmond Lyons national sales manager.

■ Jack Conroy has been appointed vice-president of operations for Information Magnetics Corp.



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2. Work closely with the independent city and regional school system in developing coordinated and cooperative approaches to the collection and use of data and data processing activities,
3. To develop a data processing system that will serve the county government through the city system,
4. To make data processing services available to surrounding towns.

It is anticipated that the city government data processing activities will include at least the following activities:

a. financial management (budgeting and appropriation accounting)
b. payroll
c. property assessing and real estate tax billing
d. utility billing
e. complete land use and property data base and analysis
f. additional municipal activities as time permits

The City and School Board are currently finalizing decisions concerning data processing hardware that will enable it to accomplish the above objectives. Consideration is being given to time-sharing equipment as well as batch operations. The Data Processing Supervisor will be organizationally directly responsible to the City Manager. Applicants must have graduated from an accredited 4-year college with a major in a related field, with 4 years of related experience OR 6-1/2 years of related experience. The position is currently classified with the pay range of $12,040 – $16,134, with specific pay dependent on experience and qualifications. For more information and a job description, contact:

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Dated December 9, 1974, at Cheyenne, Wyoming.

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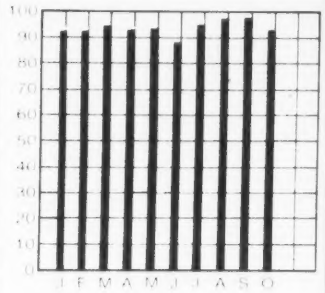

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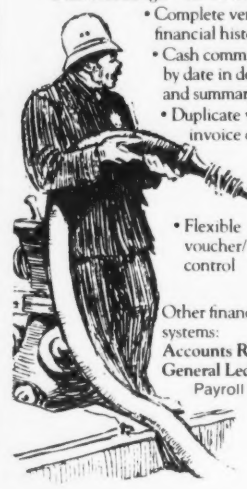

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Communications Firms' Earnings Up

Increases in earnings and revenues for the year ended Sept. 30 were reported by three communications makers: Milgo Electronic Corp., Codex Corp. and General Datacomm Industries, Inc.

Milgo's revenues jumped to $30.7 million from almost $21.9 million in 1973, while earnings rose to $3.5 million or $2.24 a share from nearly $3 million or $1.89 a share last year.

In the fourth quarter, the firm earned $957,220 or 61 cents a share compared with $693,164 or 45 cents a share in the year-ago period. Revenues were also up, to $8.1 million from $6.3 million in the same 1973 quarter.

Incoming orders for the first quarter of fiscal 1975 continue to be strong and shipments are expected to be better than the last quarter of 1974, the firm said.

Modem sales in the fourth quarter were $4.5 million while incoming orders were pegged at $5.7 million. Modem sales for the year stood at $18.3 million while incoming orders were valued at $23.3 million.

Codex showed record earnings and revenues for the fourth quarter and year.

Earnings for the year rose to $3.9 million or $2.71 a share, including a $950,000 special credit, compared with $2.1 million or $1.46 a share last year, when there was a $1 million special credit.

Annual revenues more than doubled to nearly $18 million from $8.1 million in 1973.

During the final 1974 quarter, Codex earned $1 million or 70 cents a share compared with $742,000 or 51 cents a share in the year-ago period, when there was a $357,000 special credit. Revenues rose to $5.6 million from $2.9 million.

General Datacomm earned $367,407 or 26 cents a share for the year, including a special credit of $209,800, compared with a restated loss of $154,310 for 1973.

Sales reached a record $10 million, up 47% from $6.8 million last year.

The firm has expensed as incurred all R&D costs for 1974 and restated its 1973 earnings of $653,413 to reflect the change.

Scan-Data Posts Quarter Loss Despite Increased Revenues

NORRISTOWN, Pa. – Scan-Data Corp. posted a loss for the third quarter ended Sept. 30 and a decline in nine-month earnings.

Despite higher revenues of $2.5 million compared with $1.8 million in the year-ago quarter, the firm lost $29,744 or 2 cents a share compared with earnings of $34,299 or 2 cents a share in the third quarter of 1973.

During the nine months, revenues rose to nearly $7 million from $5.1 million a year ago while earnings dropped to $13,452 or 1 cent a share compared with $49,685 or 3 cents a share in the year-ago period.

Sales shot upward during both periods, aided significantly by sales of new key-to-disk equipment and distributor sales overseas of OCR units, in addition to sales during the year of some leased systems to third-party lessors, a company spokesman said.

The third-party sales accounted in large part for the reduction in lease revenues during both periods, he added.

Sales for the third quarter totaled $2.1 million compared with $1.4 million while lease revenues declined to $17,356 from $58,623 a year ago.

Interest expenses rose to $179,725 in the quarter compared with $117,372 last year. Depreciation charges also were up, to $129,205 compared with $94,054 in the year-ago quarter.

Boothe Nine-Month Debits Down

SAN FRANCISCO – Boothe Computer Corp. continued to show reduced losses in the nine months and third quarter compared with those of a year ago.

With reduced revenues of $31.2 million for the nine months compared with $35.2 million in 1973, Boothe lost nearly $3 million or $1.34 a share compared with a loss of $11.2 or $5.26 a share in the same period last year.

Quarterly revenues also declined, to $9.7 million from $10.6 million in the 1973 period.

Boothe lost $1.5 million or 68 cents a share in the third quarter compared with a loss of $9.3 million or $4.36 a share for the same quarter last year, when there were depreciation charges of $5 million and nonrecurring charges of $2.5 million by manufacturing subsidiaries.

During the 1974 quarter, Boothe lost $268,000 from the sale of certain investments.

Courier Terminal Systems, Inc. and Boothe Airside Systems, Inc. continued to share primary responsibility for the losses during the nine months, the firm said.

Operating results for computer leasing activities for the first nine months are approximately as forecast, the company added.

ACT Sets Records for Half Year

NEW YORK – Revenues and earnings soared during the six-month period ended Sept. 30 at Advanced Computer Techniques Corp. (ACT).

With record results for any comparable period, earnings rose 96% to $137,000 or 12 cents a share compared with $70,000 or 9 cents a share in the year-ago period.

Revenues jumped 85% to $3.9 million from $2.1 million in the same 1973 period.

Major contracts in Europe are being extended through 1975, which should strengthen the firm's position in light of the present economic situation, said Charles Lecht, ACT president.

ACT provides management, product planning and product implementation services.

Bradford Subsidiary Expects to Incur Loss

NEW YORK – Bradford Computer & Systems, Inc. said its securities clearing subsidiary, Securities Processing Services, Inc., may incur a loss on an account.

While Bradford said it doesn't know the exact size of the possible loss, the loss won't exceed $1.8 million after taxes. If the account is still unsettled when 1974 figures are published, Bradford said it will establish a reserve for the maximum possible loss.

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Earnings Reports

WAVETEK
Year Ended Sept. 28

	1974	1973
Shr Ernd	$.86	$.71
Revenue	10,999,196	8,928,790
Earnings	741,420	613,150

MICRODATA
Year Ended Aug. 31

	1974	a1973
Shr Ernd	$.41	$.34
Revenue	13,829,599	8,743,110
Tax Cred	265,000	228,000
Earnings	641,466	524,781

a-Restated.

DATA CONTROL SYSTEMS
Year Ended Sept. 30

	1974	1973
Revenue	5,479,312	4,380,897
Disc Op	(834,329)	(59,526)
Loss	1,471,778	243,571

MATHEMATICA
Three Months Ended Sept. 30

	1974	a1973
Shr Ernd	$.32	$.29
Revenue	3,486,500	2,592,700
Earnings	222,900	200,800

a-Restated to reflect change in accounting method.

ADVANCED MEMORY SYSTEMS
Year Ended Sept. 30

	1974	1973
Revenue	$32,370,700	$31,382,700
Spec Cred	.....	41,900
Loss	2,119,000	196,200
3 Mo Shr	.....	.03
Revenue	7,545,700	8,228,000
Spec Chg	14,500	.....
Earnings	(2,149,200)	54,600

INFOREX
Three Months Ended Sept. 27

	1974	1973
Shr Ernd	$.08	$.31
Revenue	13,129,000	10,287,000
Tax Cred	53,000	490,000
Earnings	226,000	854,000
9 Mo Shr	.06	.95
Revenue	35,633,000	27,142,000
Tax Cred	53,000	1,197,000
Earnings	164,000	2,572,000

CAMBRIDGE MEMORIES
Year Ended Aug. 31

	1974	1973
Shr Ernd	$.70	$.49
Revenue	23,140,000	12,668,000
Tax Cred	.....	63,000
Earnings	1,040,000	626,000
3 Mo Shr	.17	.16
Revenue	6,588,000	4,397,000
Earnings	292,000	200,000

DATAPOINT
Three Months Ended Oct. 31

	1974	1973
Shr Ernd	$.50	$.41
Revenue	10,074,000	6,837,000
Tax Cred	250,000	265,000
Earnings	898,000	758,000

ON-LINE SYSTEMS
Three Months Ended Oct. 31

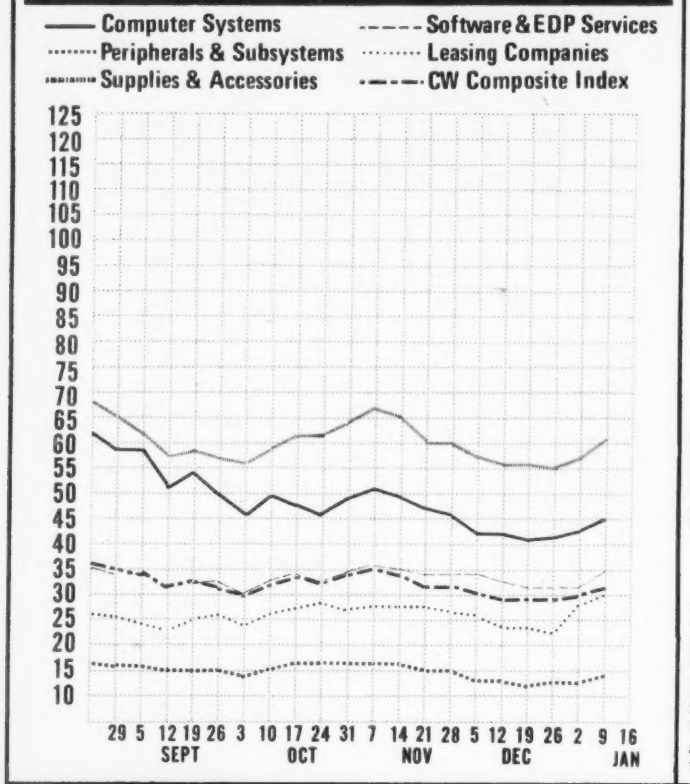
	1974	1973
Shr Ernd	$.54	$.49
Revenue	3,150,624	2,468,881
Earnings	454,112	399,139
6 Mo Shr	1.05	.82
Revenue	6,140,782	4,365,912
Earnings	881,322	661,891

RECOGNITION EQUIPMENT
Year Ended Oct. 31

	1974	1973
Shr Ernd	$.39	$.06
Revenue	42,913,000	41,746,000
Tax Cred	1,656,000	194,000
Earnings	2,087,000	324,000
3 Mo Shr	.13	.....
Revenue	14,290,000	13,438,000
Spec Item	a707,000	b(842,000)
Earnings	724,000	(905,000)

a-Tax credit. b-Charge; reduction of tax credit.

COMPUTERWORLD Computer Stocks Trading Indexes



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TRADE*QUOTES

Computerworld Stock Trading Summary

All statistics compiled, computed and formatted by TRADE★QUOTES, INC. Cambridge, Mass. 02139

EXCH		1974 RANGE (1)	CLOSE JAN 9 1975	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
N	BURROUGHS CORP	63-217	66 7/8	-7 1/8	-9.6
O	COMPUTER AUTOMATION	2- 14	2 1/2	+ 1/8	+5.2
N	CONTROL DATA CORP	10- 38	12 3/8	+1 1/2	+13.7
N	DATA GENERAL CORP	11- 38	14 1/8	0	0.0
O	DATAPOINT CORP	5- 15	5 3/4	0	0.0
O	DIGITAL COMP CONTROL	1- 5	1	+ 1/8	+14.2
N	DIGITAL EQUIPMENT	46-121	50	+2 3/4	+5.8
N	ELECTRONIC ASSOC.	1- 3	1 5/8	+ 1/4	+18.1
A	ELECTRONIC ENGINEER.	4- 11	5 3/4	+ 3/4	+15.0
N	FOXBORO	19- 48	24 5/8	+1 1/8	+4.7
O	GENERAL AUTOMATION	6- 40	6 1/4	-1 3/4	-21.8
O	GRI COMPUTER CORP	1- 2	1/8	0	0.0
N	HEWLETT-PACKARD CO	54- 90	58 7/8	-2 3/8	-3.8
N	HONEYWELL INC	18- 86	23	+1 1/4	+5.7
N	IBM	152-251	168 1/2	- 3/8	-0.2
O	INTERDATA INC	8- 22	13	- 1/8	-0.9
O	MICRODATA CORP	1- 5	1 3/4	0	0.0
N	NCR	14- 40	17 1/4	+2	+13.1
N	RAYTHEON CO	21- 39	27 1/8	+1 5/8	+6.3
N	SINGER CO	10- 40	12 1/8	+ 1/8	+1.0
N	SPERRY RAND	24- 44	27 7/8	- 1/2	-1.7
A	SYSTEMS ENG. LABS	1- 3	1 1/4	+ 1/8	+11.1
N	TEXAS INSTRUMENTS	60-115	63	-4 3/4	-7.0
O	ULTIMACC SYSTEMS INC	1- 2	3/4	0	0.0
N	VARIAN ASSOCIATES	6- 13	7 3/8	+ 3/8	+5.3
N	WANG LABS.	7- 20	7	- 1/2	-6.6
N	XEROX CORP	50-127	56 1/2	+4 1/2	+8.6
	LEASING COMPANIES				
O	BRESNAHAN COMP.	2- 2	2 1/8	0	0.0
O	COMDISCO INC	1- 7	2	+1 1/4	+166.6
A	COMMERCE GROUP CORP	2- 6	2 1/2	0	0.0
O	COMPUTER EXCHANGE	1- 1	1/4	- 1/8	-33.3
A	COMPUTER INVSTRS GRP	0- 4	1/2	-	-9.9
O	COMP. INSTALLATIONS	1- 1	1/4	0	0.0
M	DATRONIC RENTAL	1- 1	1/2	0	0.0
A	DCL INC	0- 1	1/4	- 1/8	-33.3
N	DPF INC	2- 5	3	0	0.0
O	EDP RESOURCES	2- 3	3 1/4	0	0.0
A	GRANITE MGT	1- 3	5/8	0	0.0
A	GREYHOUND COMPUTER	2- 6	2 1/4	+ 3/8	+20.0
A	ITEL	3- 6	3 3/4	+ 3/8	+11.1
N	LEASCO CORP	5- 12	5	0	0.0
O	LEASPAC CORP	0- 2	1/2	0	0.0
O	LECTRO MGT INC	1- 1	1/8	0	0.0
O	NRG INC	1- 5	1 1/4	+ 1/4	+25.0
A	PIONEER TEX CORP	2- 10	2 1/4	0	0.0
A	ROCKWOOD COMPUTER	0- 1	1/2	+ 1/8	+28.5
N	U.S. LEASING	5- 24	10 3/4	+ 7/8	+8.8

EXCH: N=NEW YORK; A=AMERICAN; P=PHIL-BALT-WASH
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER
O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

EXCH		1974 RANGE (1)	CLOSE JAN 9 1975	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
O	ADVANCED COMP TECH	1- 2	1/2	0	0.0
A	APPLIED DATA RES.	1- 3	1 1/8	+ 1/8	+12.5
O	APPLIED LOGIC	1- 1	1/8	0	0.0
N	AUTOMATIC DATA PROC	21- 57	28 1/2	-1 1/8	-3.7
O	BRANDON APPLIED SYST	1- 1	1/8	0	0.0
O	CENTRAL DATA SYSTEMS	4- 6	3	0	0.0
O	COMPUTER DIMENSIONS	1- 3	1 1/2	- 1/8	-7.6
O	COMPUTER HORIZONS	1- 5	3/4	+ 1/4	+50.0
O	COMPUTER NETWORK	1- 2	1/2	0	0.0
N	COMPUTER SCIENCES	2- 4	2 1/8	+ 1/4	+13.3
O	COMPUTER TASK GROUP	1- 1	3/8	0	0.0
O	COMPUTER TECHNOLOGY	1- 1	1/2	0	0.0
O	COMPUTER USAGE	2- 4	2 3/8	+ 1/8	+5.5
O	COMRESS	1- 1	1/8	0	0.0
O	COMSHARE	2- 4	2 7/8	+ 1/4	+9.5
N	CORDURA CORP	1- 4	1 1/2	+ 1/4	+20.0
O	DATATAB	1- 3	7/8	0	0.0
A	ELECT COMP PROG	1- 1	1/4	0	0.0
N	ELECTRONIC DATA SYS.	11- 25	12	- 7/8	-6.7
O	INFONATIONAL INC	1- 2	1/8	- 1/4	-86.6
O	I.O.A. DATA CORP	1- 1	1/4	0	0.0
O	IPS COMPUTER MARKET.	1- 1	1/2	0	0.0
O	KEANE ASSOCIATES	2- 4	1 3/4	0	0.0
O	KEYDATA CORP	1- 6	2	+ 1/8	+6.6
O	LOGICON	2- 5	3	0	0.0
A	MANAGEMENT DATA	1- 2	1 5/8	+ 3/4	+85.7
O	NATIONAL CSS INC	5- 37	6 1/4	-1	-13.7
O	NATIONAL COMPUTER CO	1- 1	1/4	0	0.0
A	ON LINE SYSTEMS INC	9- 30	10 5/8	+ 1/8	+1.1
N	PLANNING RESEARCH	2- 3	2 1/8	0	0.0
O	PROGRAMMING & SYS	1- 1	5/8	0	0.0
O	RAPIDATA INC	1- 5	2	+ 1/2	+33.3
O	SCIENTIFIC COMPUTERS	1- 1	1	+ 1/8	+14.2
O	SIMPLICITY COMPUTER	1- 1	1/4	0	0.0
O	TCC INC	1- 1	1/4	+ 1/8	+100.0
O	TYMSHARE INC	6- 12	7	- 1/8	-1.7
O	UNITED DATA CENTER	2- 4	3 1/4	0	0.0
A	URS SYSTEMS	2- 4	2 7/8	+ 5/8	+27.7
N	WYLY CORP	1- 5	2	0	0.0
	PERIPHERALS & SUBSYSTEMS				
N	ADDRESSOGRAPH-MULT	3- 11	3 5/8	0	0.0
O	ADVANCED MEMORY SYS	1- 7	1 3/8	+ 1/8	+10.0
N	AMPEX CORP	2- 5	2 3/4	+ 1/8	+4.7
O	ANDERSON JACOBSON	1- 4	1 1/4	0	0.0
O	BEEHIVE MEDICAL ELEC	1- 7	1 1/4	- 1/8	-9.0
A	BOLT,BERANEK & NEW	5- 9	5 1/4	0	0.0
N	BUNKER-RAMO	3- 8	4 1/4	+ 3/8	+9.6
A	CALCOMP	4- 11	3 3/4	- 1/4	-6.2
O	CAMBRIDGE MEMORIES	3- 16	2 7/8	- 1/4	-8.0
O	CENTRONICS DATA COMP	7- 23	7 3/4	+ 1/4	+3.3
O	CODEX CORP	8- 16	16 1/4	+2 1/4	+16.0
O	COGNITRONICS	1- 2	3/8	0	0.0

EXCH		1974 RANGE (1)	CLOSE JAN 9 1975	WEEK NET CHNGE	WEEK PCT CHNGE
O	COMPUTER COMMUN.	1- 2	1/2	0	0.0
A	COMPUTER EQUIPMENT	1- 2	1 1/8	+ 1/8	+12.5
O	COMPUTER MACHINERY	1- 5	1 3/8	+ 3/8	+37.5
O	COMPUTER TRANSCEIVER	1- 2	5/8	0	0.0
N	CONRAC CORP	10- 22	14 1/4	+2 5/8	+22.5
O	DATA ACCESS SYSTEMS	2- 3	2 1/2	0	0.0
O	DATA 100	4- 13	4 1/2	- 1/8	-2.7
A	DATA PRODUCTS CORP	2- 4	2 1/8	0	0.0
O	DATA RECOGNITION	1- 1	1/4	0	0.0
O	DATA TECHNOLOGY	2- 4	1 1/2	0	0.0
O	DECISION DATA COMPUT	3- 13	4 3/4	- 1/4	-5.0
O	DELTA DATA SYSTEMS	1- 2	3/8	0	0.0
O	DI/AN CONTROLS	1- 2	3/8	+ 1/8	+50.0
N	ELECTRONIC M & M	1- 4	1 1/2	+ 3/8	+33.3
O	FABRI-TEK	1- 3	5/8	- 1/8	-16.6
O	GENERAL COMPUTER SYS	1- 4	1 3/4	0	0.0
N	GENERAL ELECTRIC	30- 65	34 1/8	+ 3/8	+1.1
N	HAZELTINE CORP	2- 7	2 7/8	+ 1/2	+21.0
O	INFOREX INC	1- 5	1 5/8	0	0.0
O	INFORMATION DISPLAYS	1- 1	1/8	0	0.0
O	INFORMATION INTL INC	6- 14	7 3/4	+ 1/4	+3.3
A	LUNDY ELECTRONICS	3- 3	2 7/8	0	0.0
O	MANAGEMENT ASSIST	1- 1	1/8	0	0.0
N	MEMOREX	2- 5	2	+ 1/2	+33.3
A	MILGO ELECTRONICS	6- 18	10 1/8	+1 7/8	+22.7
N	MOHAWK DATA SCI	1- 4	1 1/8	- 1/4	-18.1
O	ODEC COMPUTER SYST.	1- 3	7/8	0	0.0
O	OPTICAL SCANNING	3- 6	7/8	0	0.0
O	PERTEC CORP	1- 6	2	+ 3/8	+23.0
A	POTTER INSTRUMENT	1- 5	1 3/4	0	0.0
O	PRECISION INST.	1- 3	1/2	0	0.0
O	QUANTOR CORP	2- 8	2 1/4	+ 1/2	+28.5
O	RECOGNITION EQUIP	2- 5	2 3/4	+ 1/2	+22.2
N	SANDERS ASSOCIATES	2- 8	2 7/8	+ 5/8	+27.7
O	SCAN DATA	1- 2	5/8	+ 1/8	+25.0
O	STORAGE TECHNOLOGY	6- 15	6 3/8	+ 1/4	+4.0
O	SYCOR INC	4- 13	4 1/2	- 1/4	-5.2
O	TALLY CORP.	1- 4	1 1/8	+ 1/4	+28.5
O	TEC INC	1- 7	2	+ 3/4	+60.0
N	TEKTRONIX INC	18- 48	18 3/4	-1 1/8	-5.6
N	TELEX	2- 4	2 3/4	+ 1/8	+4.7
O	WANGCO INC	3- 13	4	+ 3/8	+10.3
O	WILTEK INC	1- 8	1 1/2	+ 1/4	+20.0
	SUPPLIES & ACCESSORIES				
O	BALTIMORE BUS FORMS	4- 6	4 1/4	+ 1/4	+6.2
A	BARRY WRIGHT	4- 7	5 5/8	+ 1/2	+9.7
O	CYBERMATICS INC	1- 2	5/8	0	0.0
A	DATA DOCUMENTS	23- 54	30 3/4	+2	+6.9
O	DUPLEX PRODUCTS INC	6- 17	11 7/8	-1 1/8	-8.6
N	ENNIS BUS. FORMS	4- 7	5 1/8	+ 1/4	+5.1
O	GRAHAM MAGNETICS	5- 11	5 3/4	- 1/4	-4.1
O	GRAPHIC CONTROLS	6- 11	8 1/4	0	0.0
N	3M COMPANY	44- 79	44 1/2	- 3/8	-0.8
O	MOORE CORP LTD	33- 57	40 1/4	- 1/2	-1.2
N	NASHUA CORP	16- 45	18 3/4	-1 1/8	-5.6
O	REYNOLDS & REYNOLD	6- 35	10 1/2	+1 1/2	+16.6
O	STANDARD REGISTER	10- 16	12 1/2	+1 1/4	+11.1
O	TAB PRODUCTS CO	4- 11	4 1/2	+ 1/2	+12.5
N	UARCO	13- 23	18 3/4	+2 1/8	+12.7
A	WABASH MAGNETICS	3- 7	3 1/4	+ 3/8	+13.0
N	WALLACE BUS FORMS	14- 24	15 1/2	+ 1/4	+1.6

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EASYTRIEVE can save money for any shop that produces reports, whether for end-users or for systems analysis, because it: reduces programming time from hours and days to minutes; it eliminates compile and test time; it works at I/O speeds; it automatically formats reports or allows the user to customize his reports with a few easy commands. Increase your user-base and make your shop more cost-effective by allowing non-DP department heads to write their own EASYTRIEVE programs. Produce job accounting reports, analyze your hardware and software utilization with EASYTRIEVE SMF data analysis programs; reformat reports, generate test data, produce mailing labels and hundreds of other jobs every month. Your Pansophic representative will show you how. EASYTRIEVE is now directly interactive with the IMS data base.

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With PANVALET, the Program Management and Security System, the speed and simplicity of programming production, maintenance and management relates incredible savings to DP Managers, Operations Managers and programming personnel for all IBM shops running under DOS, OS, VS or VM.

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OPERATIONS: Never worry about passing updates twice; level numbers protect you. Always an immediate recovery with total backup of the library; capture all input to the library between backups. A total audit trail from production source to Load or Object Module. Save in speed of execution with the most proficient system available; provides internal checking of proper data in and out of the library.

MANAGEMENT: Maintain complete control through a manager's audit trail of all activity against the library... or by selective reporting for project management, by user, by language, by any library status. Rely on full library protection, as production programs can never be mistakenly modified.

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PANSOPHIC SYSTEMS, INC.

1301 W. 22nd St.,
Oak Brook, Ill. 60521

East 201/622-0190,
Central 312/325-8212,
West 213/430-7551

"We're sticklers for knowing exactly what we've got on our program library, and knowing we're working with the most current version. PANVALET makes sure that we do both. As a matter of fact, we don't allow any production program that is not PANVALET... of course, all our 30 programmers use the system. We have recommended PANVALET to many other companies."

Don Olmsted, Technical Manager
Cargill, Inc.
Minneapolis, Minn.

"Our shop has two separate libraries on PANVALET. Both fill a 3330 disk pack. We use the system mainly for storing source programs and have over three million cards compressed on the two libraries. The PANVALET TSO system is just beautiful. Program retrieval, update and storage are done simply and quickly. We're delighted with the system; every one of the 70 systems people here use PANVALET and TSO, which means about 300 times a day per library."

Ross Daniel, Sr. DP Engineer
Bell Helicopter
Fort Worth, Texas

"We use EASYTRIEVE for file maintenance, one-time reports, production jobs and program development, but basically, it's very easy to prepare special reports that answer those user questions 'How many,' 'How much,' or 'How long,' that heretofore they have been reluctant to ask because of the time and expense involved in getting these answers."

Marvin Miller, Supervisor
of Systems Implementation
Crown-Zellerbach Corp.
San Francisco, CA

"EASYTRIEVE and PANVALET are the best pieces of software we've bought since I can remember. Our auditors sleep easy at night knowing PANVALET security and backup are keeping programs safe. They have learned to access their own reports off those files with EASYTRIEVE. As a matter of fact, both these systems are so easy to learn and use that everyone here uses them... and that's really the true test of a software package's worth."

Will Munsterman
Systems and Programming Manager
Salt River Project
Tempe, Arizona

"We use PANVALET backup security for source programs, to maintain and modify programs, as a security file for JCL and as a data file for source data by batch coming out of keypunch under the Superset/Subset mode. PANVALET is used by some 75 people here."

Terry McDowell, Supervisor
of Systems Development
Kaiser Industries
Oakland, California

*"The task of managing the data sets produced by over 40 terminals is a large one, as we have so many user ID's. One pack alone has over 1,500 data sets. We use PAN*DA to keep track of the total disk space utilization, by volume and by user-group."*

Gary Gesme, Computer Specialist
Deere and Company
Moline, IL

*"We use PAN*DA mainly to do user-group analysis on our disks, to find out where we're sloppy and where we're over-extended. PAN*DA does the ID search that was so tedious and time-consuming before. We just began using the new billing option with Version 2 and have finally found out just how well, in dollars, we are using our disk space. That was revealing."*

Tony Gloriano
Supervisor of Tech Support
Warwick Electronics
Chicago, IL

"EASYTRIEVE saves me the work of 4 programmers a year because I don't have to spend days and weeks programming one-time reports."

John Germann, Vice President
Provident Life
& Accident Insurance Co.
Chattanooga, Tenn.

"I'll build large, common files such as for billing, and will extract my information with EASYTRIEVE. I can do more analysis and get more complete information than ever before... reports I couldn't begin to cost-justify in programming time without EASYTRIEVE. The system has helped us to eliminate compilers in the 30 divisions we service."

Bob Jendry, DP Department
Dresser Industries
Pittsburgh, PA.

"Utilizing EASYTRIEVE and PANVALET, we converted over 1,000 programs from COBOL-D to ANS COBOL in a completely hands-off manner in just 6 weeks. Now we're converting again, this time to 3340's, again using the systems. With EASYTRIEVE, de-blocking files is simple. We're always at our limit on our core-image library; without EASYTRIEVE, we'd be over."

Dave Berner, DP Department
Richardson Company
Melrose Park, IL

"We use EASYTRIEVE between 1000-1500 times a month between the 14 state departments that use our computer center. Over 100 systems programmers use the system for every kind of report imaginable, from one-time requests to short-time assignments to regular production jobs."

David Thornton, DP Manager
State of North Carolina
Dept. of Administrative Services
Raleigh, N.C.

"We bought EASYTRIEVE to get secretarial and documentation people involved with programming one-time report requests, and it's working out well. We haven't had the system very long, but we do generate test files and turn out reports. And it's very fast. It performed 2200 transactions in less than a minute on our 135. We're impressed. Everybody and his mother wants to try their hand at EASYTRIEVE."

Butch Thompson
Manager of Tech Support
Family Life Insurance Company
Seattle, Washington

*"PAN*DA tells us where our over-allocated data sets lie, which gives us much better utilization of our DASD resources; and we really use it to find where the VTOC lies on critical packs... no other package we tried did that for us. As for PANVALET, we have all of our source programs, some 1,200 of them, on PANVALET. A separate PANVALET is used for our procedures and standards library. The backup feature is essential for the insurance group."*

Thor Melby, Superintendent
of Systems Programmers
State Farm Fire Insurance Company
Bloomington, IL

*"In the few days we've had PAN*DA, we know we'll save ourselves time and money by not having to hand-log where every data set has gone. The system is perfect for us because we bill users for disk space; the PAN*DA billing option gives us the information we need quickly and completely."*

Frank Marino
Administrative Analyst
Addressograph-Multigraph
Mt. Prospect, IL